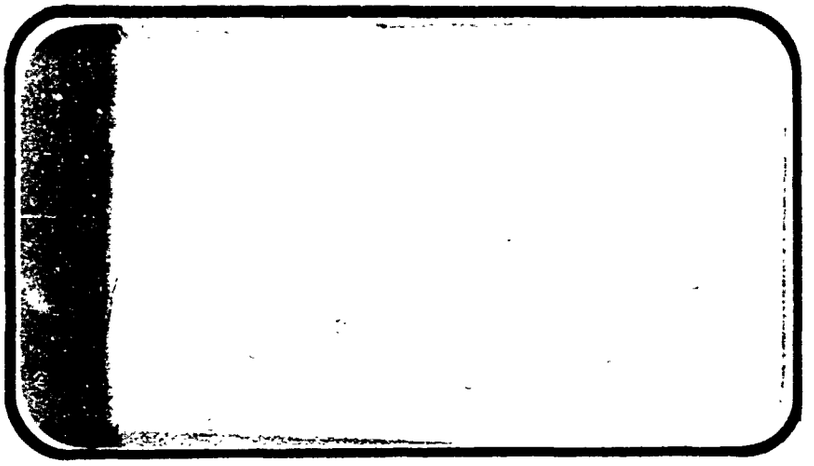
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

CR 134089



SPACE SHUTTLE

AEROTHERMODYNAMIC DATA REPORT

JOHNSON SPACE CENTER

HOUSTON, TEXAS

DATA MANagement services

SPACE DIVISION CHRYSLER CORPORATION

March, 1974

DMS DR-2102
NASA CR-134,089

RESULTS OF INVESTIGATIONS ON A 0.010-SCALE MODEL OF THE CONFIGURATION 3 SPACE SHUTTLE ORBITER AND EXTERNAL TANK IN THE NASA/AMES RESEARCH CENTER 3.5-FOOT HYPERSONIC WIND TUNNEL (IA15)

By

M. T. Petrozzi and M. D. Milam, Rockwell International
J. A. Mellenthin, NASA Ames

Prepared under NASA Contract Number NAS9-13247

By

Data Management Services
Chrysler Corporation Space Division
New Orleans, La. 70189

for

Engineering Analysis Division

Johnson Space Center
National Aeronautics and Space Administration
Houston, Texas

RESULTS OF INVESTIGATIONS ON A 0.010-SCALE MODEL OF THE CONFIGURATION 3 SPACE SHUTTLE ORBITER AND EXTERNAL TANK IN THE NASA/AMES RESEARCH CENTER 3.5-FOOT HYPERSONIC WIND TUNNEL (IA15)

By M. T. Petrozzi, M. D. Milam and J. A. Mellenthin*

ABSTRACT

Experimental aerodynamic investigations were conducted in the NASA/Ames 3.5-Foot Hypersonic Wind Tunnel during the period of October 10 through October 15, 1973. The model used for this test was a 0.010-scale of the Configuration 3 Space Shuttle Orbiter and the External Tank.

Six-component aerodynamic force and moment data were recorded over an angle of attack range from -8° to +30° at 0° and 5° angles of side-slip. Data was also recorded during beta sweeps of -8° to +10° at angles of attack of -10°, 0°, and 30°. All testing was done at Mach 7.3.

Various elevon, rudder and orbiter to external tank attaching structures and fairings were tested to determine longitudinal and lateral-directional stability characteristics. Non-metric exhaust plumes were installed during a portion of the testing to determine the effects of the main propulsion system rocket plumes.

Base pressures on the external tank, which were monitored through tubing internally routed through the external tank and orbiter, were found to be questionable during the first 10 runs. Externally mounted tubing was installed prior to run 11 and the test series were completed using

* NASA/Ames

that tubing configuration for the external tank base pressures. Subsequent to run 18, when the non-metric plumes were installed, all base pressures were monitored through externally routed tubing. See the DATA REDUCTION section for additional information.

TABLE OF CONTENTS

INDEX OF MODEL FIGURES

INDEX OF DATA FIGURES

FIGURE NUMBER	FIGURE TITLE	PLOT SCHEDULE	CONDITIONS VARIED	PAGES
4	RUDDER DEFLECTION WITH FAIRING, LONGITUDINAL	(A)	RUDDER	1-4
5	RUDDER DEFLECTION WITH FAIRING, LATERAL-DIRECTIONAL	(B)	RUDDER	5-8
6	ELEVON DEFLECTION WITHOUT FAIRING, LONGITUDINAL	(A)	ELEVON	9-12
7	AILERON DEFLECTION FAIRING, LATERAL-DIRECTIONAL	(C)	AILRON	13-15
8	POWER ON AND OFF, WITH AND WITHOUT FAIRING, LONGITUDINAL	(A)	PLUMES	16-19
9	WITH AND WITHOUT FAIRING, DE = 15 AND -40 DEGS., LONGITUDINAL	(A)	ELEVON	20-23
10	POWER ON AND OFF, WITH AND WITHOUT FAIRING, LATERAL-DIRECTIONAL	(B)	PLUMES	24-27
11	RUDDER DEFLECTION, POWER ON AND OFF, LATERAL-DIRECTIONAL (PITCH)	(C)	PLUMES	28-30
12	RUDDER DEFLECTION, POWER ON AND OFF, LATERAL-DIRECTIONAL (YAW)	(B)	PLUMES	31-34
13	RUDDER DEFLECTION, WITH BETA = 5 DEG., LATERAL-DIRECTIONAL (PITCH)	(C)	RUDDER	35-37
14	YAW EFFECTS WITH ALPHA = 0 AND 30 DEG., WITHOUT FAIRING, LAT.-DIR.	(B)	ALPHA	38-41

INDEX OF DATA FIGURES (Concluded)

FIGURE NUMBER	FIGURE TITLE	PLOT SCHEDULE	CONDITIONS VARIED	PAGES
15	SUMMARY OF SOLID PLUME PITCH EFFECTS	(D)	PLUMES	42
16	SUMMARY OF SOLID PLUME YAW EFFECTS	(E)	PLUMES	43-44
17	SUMMARY OF ELEVON EFFECTIVENESS	(F)	ELEVON	45-47
18	SUMMARY OF AILERON EFFECTIVENESS	(G)	AILRON	48
19	SUMMARY OF RUDDER EFFECTIVENESS IN YAW	(H)	RUDDER	49
20	SUMMARY OF BETA OFFSET EFFECTS IN PITCH, DBETA = 5 DEGS.	(I)	BETA	50-51
21	SUMMARY OF ALPHA OFFSET EFFECTS IN YAW	(E)	ALPHA	52-53
22	SUMMARY OF RUDDER EFFECTIVENESS IN PITCH	(J)	RUDDER	54

PLOT SCHEDULES:

(A) CA, CN, CLM vs ALPHA, CN vs CLM
(B) CY, CBL, CYN vs BETA, CY vs CYN
(C) CY, CBL, CYN vs ALPHA
(D) CN/A, CLM/A, XAC/LR vs ALPHA
(E) CY/B, CBL/B, CYN/B, YAC/L vs BETA
(F) DCN/DE, DCA/DE, DCLMDE vs ALPHA
(G) DCY/DA, DCBLDA, DCYNDA vs ALPHA
(H) DCY/DR, DCBLDR, DCYNDR vs BETA
(I) DCY/DB, DCBLDB, DCYNDB, YAC/L vs ALPHA
(J) DCY/DR, DCBLDR, DCYNDR vs ALPHA

NOMENCLATURE
General

SYMBOL	SADSAC SYMBOL	DEFINITION
a		speed of sound; m/sec, ft/sec
C_p	CP	pressure coefficient; $(p_l - p_\infty)/q$
M	MACH	Mach number; V/a
p		pressure; N/m^2, psf
q	Q(NSM) Q(PSF)	dynamic pressure; $1/2\rho V^2$, N/m^2, psf
RN/L	RN/L	unit Reynolds number; per m, per ft
V		velocity; m/sec, ft/sec
α	ALPHA	angle of attack, degrees
β	BETA	angle of sideslip, degrees
ψ	PSI	angle of yaw, degrees
ϕ	PHI	angle of roll, degrees
ρ		mass density; kg/m^3, $slugs/ft^3$
		Reference & C.G. Definitions
A_b		base area; m^2, ft^2
b	BREF	wing span or reference span; m, ft
c.g.		center of gravity
ℓ_{REF} $\bar{c}$	LREF	reference length or wing mean aerodynamic chord; m, ft
S	SREF	wing area or reference area; m^2, ft^2
	MRP	moment reference point
	XMRP	moment reference point on X axis
	YMRP	moment reference point on Y axis
	ZMRP	moment reference point on Z axis

SUBSCRIPTS

b	base
l	local
s	static conditions
t	total conditions
∞	free stream

NOMENCLATURE (Continued)

Body-Axis System

SYMBOL	SADSAC SYMBOL	DEFINITION
C_N	CN	normal-force coefficient; $\frac{\text{normal force}}{qS}$
C_A	CA	axial-force coefficient; $\frac{\text{axial force}}{qS}$
C_Y	CY	side-force coefficient; $\frac{\text{side force}}{qS}$
C_{A_b}	CAB	base-force coefficient; $\frac{\text{base force}}{qS}$ $-A_b(p_b - p_\infty)/qS$
C_{A_f}	CAF	forebody axial force coefficient, $C_A - C_{A_b}$
C_m	CLM	pitching-moment coefficient; $\frac{\text{pitching moment}}{qS\ell_{REF}}$
C_n	CYN	yawing-moment coefficient; $\frac{\text{yawing moment}}{qSb}$
C_ℓ	CBL	rolling-moment coefficient; $\frac{\text{rolling moment}}{qSb}$

Stability-Axis System

C_L	CL	lift coefficient; $\frac{\text{lift}}{qS}$
C_D	CD	drag coefficient; $\frac{\text{drag}}{qS}$
C_{D_b}	CDB	base-drag coefficient; $\frac{\text{base drag}}{qS}$
C_{D_f}	CDF	forebody drag coefficient; $C_D - C_{D_b}$
C_Y	CY	side-force coefficient; $\frac{\text{side force}}{qS}$
C_m	CLM	pitching-moment coefficient; $\frac{\text{pitching moment}}{qS\ell_{REF}}$
C_n	CLN	yawing-moment coefficient; $\frac{\text{yawing moment}}{qSb}$
C_ℓ	CSL	rolling-moment coefficient; $\frac{\text{rolling moment}}{qSb}$
L/D	L/D	lift-to-drag ratio; C_L/C_D

NOMENCLATURE (Continued)

ADDITIONS TO STANDARD NOMENCLATURE

SYMBOL	SADSAC SYMBOL	DEFINITION
δ_a	AILRON	aileron, total aileron deflection angle, degrees, (left aileron-right aileron)/2
δ_e	ELEVON	elevon, surface deflection angle, positive deflection, trailing edge down; degrees
δ_r	RUDDER	rudder, surface deflection angle, positive deflection, trailing edge to the left; degrees
PL_l	PLUMES	solid plumes (Ref. figure 2a), as a parameter PLUMES = 1 (plumes on), PLUMES = 0 (plumes off)
C_{N_α}	CN/A	normal force coefficient derivative with ALPHA, per degree
C_{m_α}	CLM/A	pitching moment coefficient derivative with ALPHA, per degree
X_{ac}/ℓ_{REF}	XAC/LR	pitch aerodynamic center, -(CLM/A)/(CN/A)
C_{Y_β}	CY/B	side force coefficient derivative with BETA, per degree
C_{ℓ_β}	CBL/B	rolling moment coefficient derivative with BETA, per degree
C_{n_β}	CYN/B	yawing moment coefficient derivative with BETA, per degree
Y_{ac}/ℓ_{REF}	YAC/L	yaw aerodynamic center -(CYN/B)/(CY/B) for β sweeps, -(DCYNDB)/(DCY/DB) for α sweeps
$C_{N_{\delta_e}}$	DCN/DE	normal force coefficient due to ELEVON, per degree
$C_{A_{\delta_e}}$	DCA/DE	axial force coefficient due to ELEVON, per degree
$C_{m_{\delta_e}}$	DCLMDE	pitching moment coefficient due to ELEVON, per degree
$C_{n_{\delta_a}}$	DCYNDA	yawing moment due to AILERON, per degree, (body axis)

NOMENCLATURE (Concluded)

SYMBOL	SADSAC SYMBOL	DEFINITION
$C_{\ell_{\delta_a}}$	DCBLDA	rolling moment due to aileron, per degree, (body axis)
$C_{Y_{\delta_a}}$	DCY/DA	side force due to aileron, per degree, (body axis)
$C_{n_{\delta_r}}$	DCYNDR	yawing moment due to RUDDER, per degree, (body axis)
$C_{\ell_{\delta_r}}$	DCBLDR	rolling moment due to RUDDER, per degree, (body axis)
$C_{Y_{\delta_r}}$	DCY/DR	side force due to RUDDER, per degree
$C_{n_{\delta_\beta}}$	DCYNDB	yawing moment due to BETA, per degree
$C_{\ell_{\delta_\beta}}$	DCBLDB	rolling moment due to BETA, per degree
$C_{Y_{\delta_\beta}}$	DCY/DB	side force due to BETA, per degree

CONFIGURATIONS INVESTIGATED

The following summarizes configurations investigated and nomenclature used to designate their model components:

$OT = B_{19}\ C_7\ E_{23}\ F_5\ M_4\ N_{24}\ N_8\ R_5\ V_7\ W_{107}\ T_{10}$

$P_1 = PT_4\ PT_5\ PT_6$; $A_1 = AT_6\ AT_7\ AT_{11}$;

$L = FL_3\ FL_4$; $F = FR_1$

Config. Symbol	Component Description	Drawing Lines
B_{19}	Body	VL70-000139
C_7	Canopy	VL70-000139
E_{23}	Elevons	VL70-000139
F_5	Body Flap	VL70-000139
M_4	Orbital Maneuvering System	VL70-000139
N_{24}	Orbiter SSME Nozzles	VL70-000140A
N_8	OMS Nozzles	VL70-000089B
R_5	Rudder	VL70-000140A
V_7	Vertical Tail	VL70-000139
W_{107}	Wing	VL70-000139B
T_{10}	External Tank	VL78-000041B

S_{12}	Boosters (Solid Rocket)	VL77-000036A
PL_1	Solid Plumes	Defined in Model Dimen.
	Attach Structure (Simulated)	
AT_{11}	Front Orbiter to External Tank	VL72-000088D & 89
AT_6	Left Rear Orbiter to External Tank	VL72-000088D & 89
AT_7	Right Rear Orbiter to External Tank	VL72-000088D & 89
AT_8	Front SRB to External Tank	VL72-000106
AT_9	Rear SRB to External Tank	VL72-000106
PT_4	LO_2 Vent Line Fairing	VL78-000031A
PT_5	LO_2 Feed Line	VL78-000031A
PT_6	LH_2 Vent Line	VL78-000031A
	Feed Lines (from External Tank to Orbiter)	
FL_3	LO_2 Feedlines	VL78-000050
FL_4	LH_2 Feedline	VL78-000050
	SRB Protuberances	
PS_1	Electrical Tunnel Fairing	Sketch "SRB Electr. Tunnel"
PS_2	Attach Ring	VL77-000036A
PS_3	Separation Rocket Fairing	VL77-000036A
FR_1	Umbilical Door Fairing	VL78-000050

TEST FACILITY

The NASA-Ames 3.5-Foot Hypersonic Wind Tunnel is a closed-circuit, blowdown-type tunnel capable of operating at nominal Mach numbers of 5, 7, and 10 at pressures to 1800 psia and temperatures to 3400°R for run times to four minutes. The major components of the facility include a gas storage system where the test gas is stored at 3000 psi, a storage heater filled with aluminum-oxide pebbles capable of heating the test gas to 3400°R, axisymmetric contoured nozzles with exit diameters of 42 inches for generating the desired Mach number, and a 900,000 ft^3 vacuum storage system which operates to pressures of 0.3 psia. The test section itself is an open-jet type enclosed within a chamber approximately 12-feet in diameter and 40-feet in length, arranged transversally to the flow direction.

A model support system is provided that can pitch models through an angle-of-attack range of -20 to +18 degrees, in a vertical plane, about a fixed point of rotation on the tunnel centerline. This rotation point is adjustable from 1 to 5 feet from the nozzle exit plane. The model normally is out of the test stream (strut centerline 37-inches from tunnel centerline) until the tunnel test conditions are established after which it is inserted. Insertion time is adjustable to as little as 1/2 second and models may be inserted at any strut angle.

A high-speed, analog-to-digital data acquisition system is used to record test data on magnetic tape. The present system is equipped to measure and record the outputs from 80 transducers in addition to 20 channels of tunnel parameters.

DATA REDUCTION

Aerodynamic forces and moments have been reduced to coefficient form based on the following reference values:

S_{ref} = total theoretical wing projected area = 0.2690 ft^2

ℓ_{ref} = body length = 12.903 in

b_{ref} = total wing span = 9.3668 in

The moments have been reduced about a reference moment center located at the external tank STA 9.89 (this is orbiter STA 2.38) on the external tank center line.

All data are corrected for model base pressure effects. The groupings of the manifolded pressures along with their designated symbols of the effective base area, magnitude of the base areas, pressure coefficient symbols, base/cavity axial-force coefficient definitions, and the orifice number assignments are listed as follows:

Runs 1 through 18:

Base Area Name	Area Desig.	Area, Numerical Value - Sq. in	Pressure Coefficient Symbol	Pressure Orifice Number(s)
Orbiter Upper Base	A_{BU}	1.31	$C_{P_{BU}}$	3
Orbiter Lower Base	A_{BL}	1.97	$C_{P_{BL}}$	4
OMS Upper (Recessed) Base	A_{OU}	0.80	$C_{P_{OU}}$	1
OMS Lower (Extended) Base	A_{OL}	0.52	$C_{P_{OL}}$	2

Orbiter Balance Cavity	A_{BC}	1.78	$C_{P_{BC}}$	7
External Tank Base, inner	A_{ETI}	3.99	$C_{P_{B_{ETI}}}$	5
External Tank Base, outer	$A_{BC_{ETO}}$	4.32	$C_{P_{B_{ETO}}}$	6
Runs subsequent to no.18:				
Orbiter Upper Base	A_{BU}	2.30	$C_{P_{BU}}$	1
Orbiter Lower Base	A_{BL}	2.30	$C_{P_{BL}}$	2
Orbiter Balance Cavity	A_{BC}	1.78	$C_{P_{BC}}$	3
External Tank Base, inner	A_{ETI}	3.99	$C_{P_{B_{ETI}}}$	4
External Tank Base, outer	$A_{BC_{ETO}}$	4.32	$C_{P_{B_{ETO}}}$	5

TABLE I.

TEST : IA15 DATE : 15 OCT. 1973

TEST CONDITIONS

MACH NUMBER	REYNOLDS NUMBER (per unit length)	DYNAMIC PRESSURE (pounds/sq. inch)	STAGNATION TEMPERATURE (degrees Fahrenheit)
7.3	2×10^6 /ft	2.3	1709°

BALANCE UTILIZED: MK XIV A (1 inch)

	CAPACITY:	ACCURACY:	COEFFICIENT TOLERANCE:
NF	800 pounds	1/2%	
SF	400 pounds	1/2%	
AF	100 pounds	1/2%	
PM	1600 in-pounds	1/2%	
RM	250 in-pounds	1/2%	
YM	660 in-pounds	1/2	

COMMENTS:

TABLE II.

TEST: ARC 3.5-175 (IA15) | DATA SET/RUN NUMBER COLLATION SUMMARY | DATE: 15 OCTOBER 73

DATA SET IDENTIFIER	CONFIGURATION	SCHD. α	SCHD. β	PARAMETERS/VALUES Se	...	SR	PLN	NO. OF RUNS	MACH NUMBERS 7.3	TEST RUN NUMBERS
REG002	ϕT+L+F,+i,+F	C	0	0	0	0	OFF	1	2	
003	+F		0	0		-20		1	3	
004	+F		0	-40		0		1	4	
005	+F		0	+15				1	5	
006			0	+15				1	6	
007			0	-40				1	7	
008			0	-20				1	8	
009			0	0	10			1	9	
010			0	0	0			1	10	
012	+F		5			-20		1	12	
013	+F		5			0		1	13	
014	+F	0	B			0		1	14	
015	+F	0				-20		1	15	
016		0				0		1	16	
017		30				0		1	17	
018		-10				0		1	18	
019	+F	0				0	ON	1	19	
020	+F	0				-20		1	20	

1 7 13 19 25 31 37 43 49 55 61 67 75 76

CM KV ICA ICLM ICYM ICBL MACH 6

α OR β SCHEDULES: α(C) = -8° → Δα = 2° → 10° → Δα = 5° → 30°; α(A) = -8° → Δα = 2° → 10°; β(B) = -10° → Δβ = 2° → 8°

COEFFICENTS | IDVAR (1) | IDVAR (2) | NDV

TABLE II. (CONTINUED)

TEST: ARC 3.5-175 (IA15) — DATA SET/RUN NUMBER COLLATION SUMMARY — DATE: 15 OCTOBER 73

DATA SET IDENTIFIER	CONFIGURATION	SCHD. α	SCHD. β	PARAMETERS/VALUES Se	Sc	SR	PLN	NO. OF RUNS	MACH NUMBERS 7.3	TEST RUN NUMBERS
REG021	ϕT+L +F, +W	O	B	0	0	0	ON	1	21	
022		A	O	↓	↓	0	↓	1	22	
023	+F	A	O	↓	↓	-20	↓	1	23	
024	+F	A	O	↓	↓	0	↓	1	24	
025	↓	C	O	15	↓	0	↓	1	25	

1 7 13 19 25 31 37 43 49 55 61 67 75 76

CN IGY IGA IGLM IGYN IGBL MACH 6

α OR β SCHEDULES — COEFFICENTS — IDVAR (1) — IDVAR (2) — NDV

α(C) = -8° → Δα = 2° → 10° & α = 5° → 30°

β(B) = -10° → Δβ = 2° → 8°

α (A) = -8° → Δα = 2° → 10°

TABLE III. - MODEL DIMENSIONAL DATA

MODEL COMPONENT: BODY - B19

GENERAL DESCRIPTION: Fuselage, Configuration 3, per Rockwell Lines VL70-000139B.

NOTE: Identical to B_{17} except forebody.

Model Scale = 0.010

DRAWING NUMBER: VL70-000139B

DIMENSIONS:	FULL-SCALE	MODEL SCALE
Length - IN.	1290.3	12.903
Max. Width - IN.	267.6	2.676
Max. Depth - IN.	244.5	2.445
Fineness Ratio	4.82175	4.82175
Area - FT^2		
Max. Cross-Sectional	386.67	0.03867
Planform		
Wetted		
Base		

TABLE III. - Continued.

MODEL COMPONENT: Canopy - C7

GENERAL DESCRIPTION: Configuration 3 per Rockwell Lines VL70-000139

Model Scale = 0.010

DRAWING NUMBER VL70-000139

DIMENSION:	FULL SCALE	MODEL SCALE
Length (X_o = 433 to X_o = 670) - in FS	237	2.370
Max Width		
Max Depth (Z_o = to Z_o = 501) - in FS		
Fineness Ratio		
Area		
Max Cross-Sectional		
Planform		
Wetted		
Base		

TABLE III. - Continued.

MODEL COMPONENT: ELEVON - E23

GENERAL DESCRIPTION: Configuration 3 per W107 Rockwell Lines VL70-0001393, data for (1) of (2) sides

Model Scale = 0.010

DRAWING NUMBER: VL70-0001393

DIMENSIONS:	FULL-SCALE	MODEL SCALE
Area - FT^2	205.52	0.02055
Span (equivalent) - IN.	353.34	3.533
Inb'd equivalent chord	114.78	1.147
Outb'd equivalent chord	55.00	0.550
Ratio movable surface chord/ total surface chord		
At Inb'd equiv. chord	.208	.208
At Outb'd equiv. chord	.400	.400
Sweep Back Angles, degrees		
Leading Edge	0.00	0.00
Tailing Edge	-10.24	-10.24
Hingeline	0.00	0.00
Area Moment (Normal to hinge line)- FT^3 Product of Area Moment	1548.07	.001548

TABLE III. - Continued.

MODEL COMPONENT: F5 Body Flap

GENERAL DESCRIPTION: 3 Configuration per Rockwell Lines VL70-000139

Scale Model = 0.010

DRAWING NUMBER VL70-000139

DIMENSION:	FULL SCALE	MODEL SCALE
Length - in	84.70	0.8470
Max Width - in	267.6	2.676
Max Depth		
Fineness Ratio		
Area - Ft^2		
Max Cross-Sectional		
Planform	142.5	0.01425
Wetted		
Base	38.0958	.00380958

TABLE III. - Continued.

MODEL COMPONENT: OMS Pod - M_4

GENERAL DESCRIPTION: Configuration 3 per Rockwell Lines VL70-000139

NOTE: M_4 identical to M3, except intersection to fuselage.

Model Scale = 0.010.

DRAWING NUMBER VL70-000139

DIMENSION:	FULL SCALE	MODEL SCALE
Length - IN	346.0	3.460
Max Width - IN	108.0	1.080
Max Depth - IN	113.0	1.130
Fineness Ratio		
Area - FT^2		
Max Cross-Sectional		
Planform		
Wetted		
Base		

TABLE III. - Continued.

MODEL COMPONENT: NOZZLES - N8

GENERAL DESCRIPTION: Basic CMS Nozzle of Configuration 2A per Rockwell Lines VL70-008306 and VL70-000089"B". Intersection of nozzle exit plane and nozzle centerline at X_o = 1570.75, Y_o = ±99.25, Z_o = 507.25

MODEL SCALE = 0.010

DRAWING NO. VL70-008306, VL70-000089"B", SS-A00092

DIMENSIONS	FULL SCALE	MODEL SCALE
Mach No.		
Length ~ in.		
Gimbal Point to Exit Plane		
Throat to Exit Plane		
Diameter ~ in.		
Exit	50.00	0.500
Throat	N/A	N/A
Inlet	28.00	0.280
Area ~ ft^2./Nozzle		
Exit	13.635	0.00136
Throat		
Gimbal Point (station) ~ in.		
X	1518.0	15 .180
Y	±88.0	0.880
Z	492.0	4.920
Null Position ~ deg.		
Pitch	15°49'	15°49'
Yaw (Outb'd)	±12°17'	±12°17'

TABLE III. - Continued.

MODEL COMPONENT: MPS NOZZLES - H 24

GENERAL DESCRIPTION: Configuration 3A MPS Nozzles

MODEL SCALE = 0.010

DRAWING NO. VL70-0001A0A, VL70-0050304

DIMENSIONS	FULL SCALE	MODEL SCALE
Mach No.		
Length ~ in.		
Gimbal Point to Exit Plane		
Throat to Exit Plane		
Diameter ~ in.		
Exit	91.000	0.910
Throat		
Inlet		
Area ~ ft^2. /Nozzle		
Exit	45.16585	0.00452
Throat		
Gimbal Point (station) ~ in.		
Upper Nozzle		
X	1445	14.450
Y	0	0
Z	443	4.430
Lower Nozzles		
X	1468.16996	14.68170
Y	±53.00000	± 0.530
Z	342.63938	3.42640
Null Position ~ deg.		
Upper Nozzle		
Pitch	16°	16°
Yaw	0°	0°
Lower Nozzles		
Pitch	10°	10°
Yaw (outb'd)	3.5°	3.5°

TABLE III. - Continued.

MODEL COMPONENT: Solid Plume - PL1

GENERAL DESCRIPTION: SSME simulated plumes from N24 nozzles to represent all 3 engines at M = 5.5 during exit trajectory

MODEL SCALE = 0.010

DRAWING NUMBER:

COORDINATES:

Ratio of local plume radius to nozzle exit plane internal radius	Ratio of local axial distance from nozzle exit plane to nozzle exit plane internal radius
1.053	0.057
1.943	1.122
2.772	2.250
3.497	3.341
4.450	4.912
5.421	6.642
5.905	7.566
6.389	8.529
7.321	10.496
7.861	11.699
8.136	12.330
8.672	13.602
8.937	14.367
9.204	14.912
9.464	15.569

DIMENSIONS:	FULL SCALE	MODEL SCALE
Nozzle Exit Radius, in.	45.2	0.452

TABLE III. - Continued.

MODEL COMPONENT: RUDDER - R5

GENERAL DESCRIPTION: 2A, 3 and 3A Configuration per Rockwell Lines VL70-000095

Model Scale = 0.010

DRAWING NUMBER: VL70-000095

DIMENSIONS:	FULL-SCALE	MODEL SCALE
Area - FT^2	106.38	0.0106 8
Span (equivalent) - IN.	201.0	2.010
Inb'd equivalent chord	91.585	0.916
Outb'd equivalent chord	50.833	0.508
Ratio movable surface chord/ total surface chord		
At Inb'd equiv. chord	0.400	0.400
At Outb'd equiv. chord	0.400	0.400
Sweep Back Angles, degrees		
Leading Edge	34.83	34.83
Tailing Edge	26.25	26.25
Hingeline	34.83	34.83
Area Moment (Normal to hinge line)- FT^3 Product of Area and Mean Chord	526.13	000526

TABLE III. - Continued.

MODEL COMPONENT: BOOSTER SOLID ROCKET MOTOR - S12

GENERAL DESCRIPTION: Configuration 3A, Data for (1) of (2) sides, per Rockwell Lines VL77-0000364

Model Scale = 0.010

DRAWING NUMBER VL72-0000884
VL77-0000364

DIMENSION:	FULL SCALE	MODEL SCALE
Length (Includes Nozzle) - IN.	1741.0	17.410
Max Width (Tank Dia) - IN.	142.3	1.423
Max Depth (Aft Shroud) - IN.	192.0	1.920
Fineness Ratio	9.06771	9.06771
Area - FT^2		
Max Cross-Sectional	201.06193	0.0201
Planform		
Wetted		
Base		
WP of BSRM Centerline (Z_T) - IN.	400	4.00
FS of BSRM Nose (X_T) - IN.	200	2.00

TABLE III. - Continued.

MODEL COMPONENT: EXTERNAL TANK - T10

GENERAL DESCRIPTION: External Oxygen Hydrogen Tank, 3 Configuration, per Rockwell Lines VL78-000041 and VL72-000088

Model Scale = 0.010

DRAWING NUMBER VL72-000088 VL78-000041

DIMENSION:	FULL SCALE	MODEL SCALE
Length - IN (Nose @ X_T = 309)	1865	18.65
Max Width (Dia) - IN.	324	3.24
Max Depth	-	-
Fineness Ratio	5.75617	5.75617
Area - FT^2		
Max Cross-Sectional	572.555	0.0573
Planform		
Wetted		
Base		
WP of Tank Centerline (X_T) IN.	400.0	4.00

TABLE III. - Continued.

MODEL COMPONENT: VERTICAL - V7

GENERAL DESCRIPTION: Centerline vertical tail, doublewedge airfoil with rounded leading edge.

NOTE: Same as V5, but with manipulator housing removed.

Model Scale = 0.010

DRAWING NUMBER: VL70-000139

DIMENSIONS:	FULL-SCALE	MODEL SCALE
TOTAL DATA		
Area (Theo) Ft^2	425.92	0.0425
Planform		
Span (Theo) In	315.72	3.157
Aspect Ratio	1.675	1.675
Rate of Taper	0.507	0.507
Taper Ratio	0.404	0.404
Sweep Back Angles, degrees		
Leading Edge	45.000	45.000
Trailing Edge	26.249	26.249
0.25 Element Line	41.130	41.130
Chords:		
Root (Theo) WP	268.50	2.685
Tip (Theo) WP	103.47	1.085
MAC	199.31	1.998
Fus. Sta. of .25 MAC	1463.50	14.635
W. P. of .25 MAC	635.522	6.355
B. L. of .25 MAC	0.00	0.00
Airfoil Section		
Leading Wedge Angle Deg	10.000	10.000
Trailing Wedge Angle Deg	14.920	14.920
Leading Edge Radius	2.0	0.020
Void Area - Ft^2	13.17	0.131
Blanketed Area	0.00	0.00

TABLE III. - Continued.

MODEL COMPONENT: WING-W 107

GENERAL DESCRIPTION: Configuration 3 per Rockwell Lines VL70-0001398

NOTE: Same as W103, except cuff, airfoil and incidence angle.

Model Scale = 0.010

TEST NO. DWG. NO. VL70-0001398

DIMENSIONS:	FULL-SCALE	MODEL SCALE
TOTAL DATA		
Area (Theo.) Ft^2 Planform	2690.00	0.2690
Span (Theo In.	936.68	9.3668
Aspect Ratio	2.265	2.265
Rate of Taper	1.177	1.177
Taper Ratio	0.200	0.200
Dihedral Angle, degrees (@ TE of Elevon)	3.500	3.500
Incidence Angle, degrees	0.500	0.500
Aerodynamic Twist, degrees	+3.000	+3.000
Sweep Back Angles, degrees		
Leading Edge	45.000	45.000
Trailing Edge	-10.24	-10.24
0.25 Element Line	35.209	35.209
Chords:		
Root (Theo) B.P.0.0.	689.24	6.892
Tip, (Theo) B.P.	137.85	1.378
MAC	474.81	4.748
Fus. Sta. of .25 MAC	1136.89	11.3689
W.P. of .25 MAC	299.20	2.992
B.L. of .25 MAC	182.13	1.8213
EXPOSED DATA		
Area (Theo) Ft^2	1752.29	0.1752
Span, (Theo) In. BP108	720.68	7.2068
Aspect Ratio	2.058	2.058
Taper Ratio	0.2451	0.2451
Chords		
Root BP108	562.40	5.6240
Tip 1.00 $\frac{b}{2}$	137.85	1.3785
MAC	393.03	3.9303
Fus. Sta. of .25 MAC	1185.31	11.8531
W.P. of .25 MAC	300.20	3.002
B.L. of .25 MAC	251.76	2.518
Airfoil Section (Rockwell Mod NASA) XXXX-64		
Root $\frac{b}{2}$ =	0.10	0.10
Tip $\frac{b}{2}$ =	0.12	0.12
Data for (1) of (2) Sides		
Leading Edge Cuff Planform Area Ft^2	118.333	0.0118
Leading Edge Intersects Fus M. L. @ Sta	500	5.00
Leading Edge Intersects Wing @ Sta	1083.4	10.834

TABLE III. - Continued.

MODEL COMPONENT: Attach Structure - AT_6

GENERAL DESCRIPTION: Right Rear, Orbiter to External Tank

MODEL SCALE = 0.010

DRAWING NO. VL72-000088B + VL72-000089 NOTE: Use first drawing for location and second drawing for detail of struts

DIMENSIONS:

	FULL SCALE	MODEL SCALE
First Strut		
Diameter in. (Approx.)	1	0.010
Fwd Location, in. (Attach to Orb.)		
X_o	1307	13.07
X_s	2058	20.58
Approximate Aft Location, in. (Attach to Orb.)		
X_o	1107	11.07
X_s	1858	18.58
(Note: This strut is the mirror image of Strut AT_7)		
Second Strut		
Diameter, in. (Approx.)	1	0.010
Location, in.		
X_o	1307	13.07
X_s	2058	20.58
(Note: This is a Cross-Brace Strut)		

TABLE III. - Continued.

MODEL COMPONENT: Attach Structure - AT_7

GENERAL DESCRIPTION: Left Rear, Orbiter to External Tank

MODEL SCALE = 0.010

DRAWING NO. VL7 -000088B + VL72-000089 NOTE: Use first drawing for location and second drawing for detail of struts

DIMENSIONS:	FULL SCALE	MODEL SCALE
FORWARD ATTACH POINTS		
Orbiter to Tank		
Number of Struts	1	1
Diameter in. (Approx.)	1	0.010
Location in.		
X_o	1307	13.07
X_T	2058	20.58
Orbiter to SRB		
Number of Struts		
Diameter in.		
Location in.		
X_o		
X_s		
Tank to SRB		
Number of Struts		
Diameter in.		
Location in.		
X_T		
X_s		
AFT ATTACH POINTS		
Orbiter to Tank		
Number of Struts	1	1
Diameter in. (Approx.)	1	0.010
Location in. (Approx.)		
X_o	1107	11.07
X_T	1858	18.58
Orbiter to SRB		
Number of Struts		
Diameter in.		
Location in.		
X_o		
X_s		
Tank to SRB		
Number of Struts		
Diameter in.		
Location in.		

TABLE III. - Continued.

MODEL COMPONENT: Attach Structure - AT 8

GENERAL DESCRIPTION: Front, SRB to External Tank

MODEL SCALE = 0.010

DRAWING NO. VL72-00106

DIMENSIONS:	FULL SCALE	MODEL SCALE
FORWARD ATTACH POINTS		
Orbiter to Tank		
Number of Struts		
Diameter in.		
Location in.		
X_O		
X_T		
Orbiter to SRB		
Number of Struts		
Diameter in.		
Location in.		
X_O		
X_S		
Tank to SRB		
Number of Struts (3 to each SRB)	6	6
Diameter in. (Approx)	5/6	0.06
Location in.		
X_T	947	9.47
X_S	404	4.04
AFT ATTACH POINTS		
Orbiter to Tank		
Number of Struts		
Diameter in.		
Location in.		
X_O		
X_T		
Orbiter to SRB		
Number of Struts		
Diameter in.		
Location in.		
X_O		
X_S		
Tank to SRB		
Number of Struts		
Diameter in.		
Location in.		
X_T		
X_S		

TABLE III. - Continued.

MODEL COMPONENT: Attach Structure - AT9

GENERAL DESCRIPTION: Rear, SRB to External Tank

MODEL SCALE = 0.010

DRAWING NO. VL72-00

DIMENSIONS:	FULL SCALE	MODEL SCALE
FORWARD ATTACH POINTS		
Orbiter to Tank		
Number of Struts		
Diameter in.		
Location in.		
X_o		
X_T		
Orbiter to SRB		
Number of Struts		
Diameter in.		
Location in.		
X_o		
X_s		
Tank to SRB		
Number of Struts (3 to each SRB)	6	6
Diameter in. (Approx.)	576	0.06
Location in.		
X_T	2058	20.58
X_s	1515	15.15
AFT ATTACH POINTS		
Orbiter to Tank		
Number of Struts		
Diameter in.		
Location in.		
X_o		
X_T		
Orbiter to SRB		
Number of Struts		
Diameter in.		
Location in.		
X_o		
X_s		
Tank to SRB		
Number of Struts		
Diameter in.		
Location in.		
X_T		
X_s		

TABLE III. - Continued.

MODEL COMPONENT: Attach Structure - AT_{11}

GENERAL DESCRIPTION: Front, Orbiter to External Tank

MODEL SCALE = 0.010

DIMENSIONS:

	FULL SCALE	MODEL SCALE
Number of Struts	2	2
Width of Each Strut	12½	.125
Length of Each Strut	25	.250
Location		
X_o	391.0	3.91
X_T	1132.0	11.32

NOTE: Configuration (AT_{11})is the same as configuration AT_5 except legs are 12½ by 25 instead of 6 inches diameter.

TABLE III. - Concluded.

MODEL COMPONENTS: PT_4, PT_5, PT_6, FL_3, FL_4, PS_1, PS_2, PS_3, FR.

GENERAL DESCRIPTON: General dimensional data not applicable. See description in "Configurations Investigated" section and in figure .

Notes:

1. Positive directions of force cofficients, moment coefficients, and angles are indicated by arrow
2. For clarity, origins of wind and stability axes have been displaced from the center of gravity

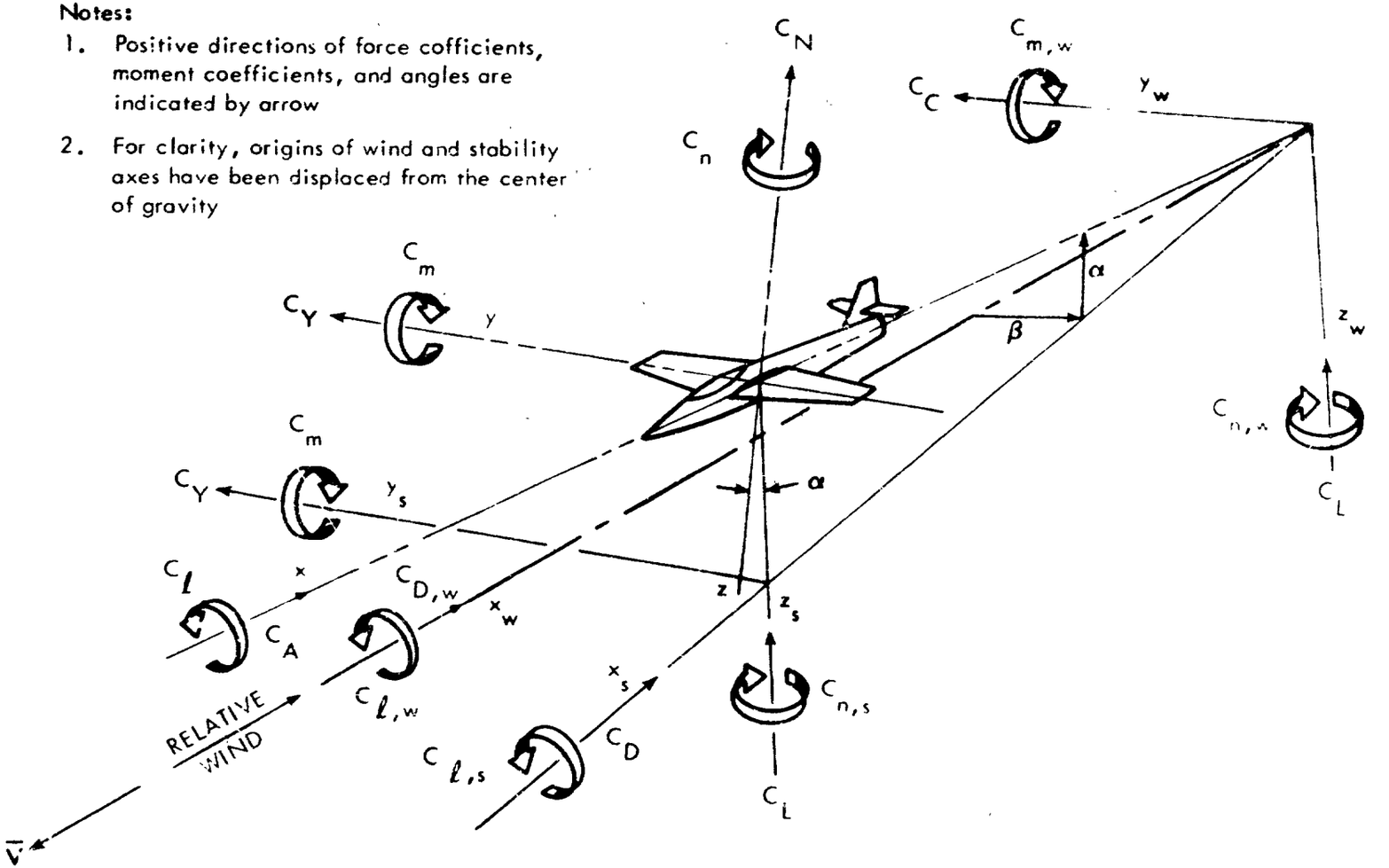
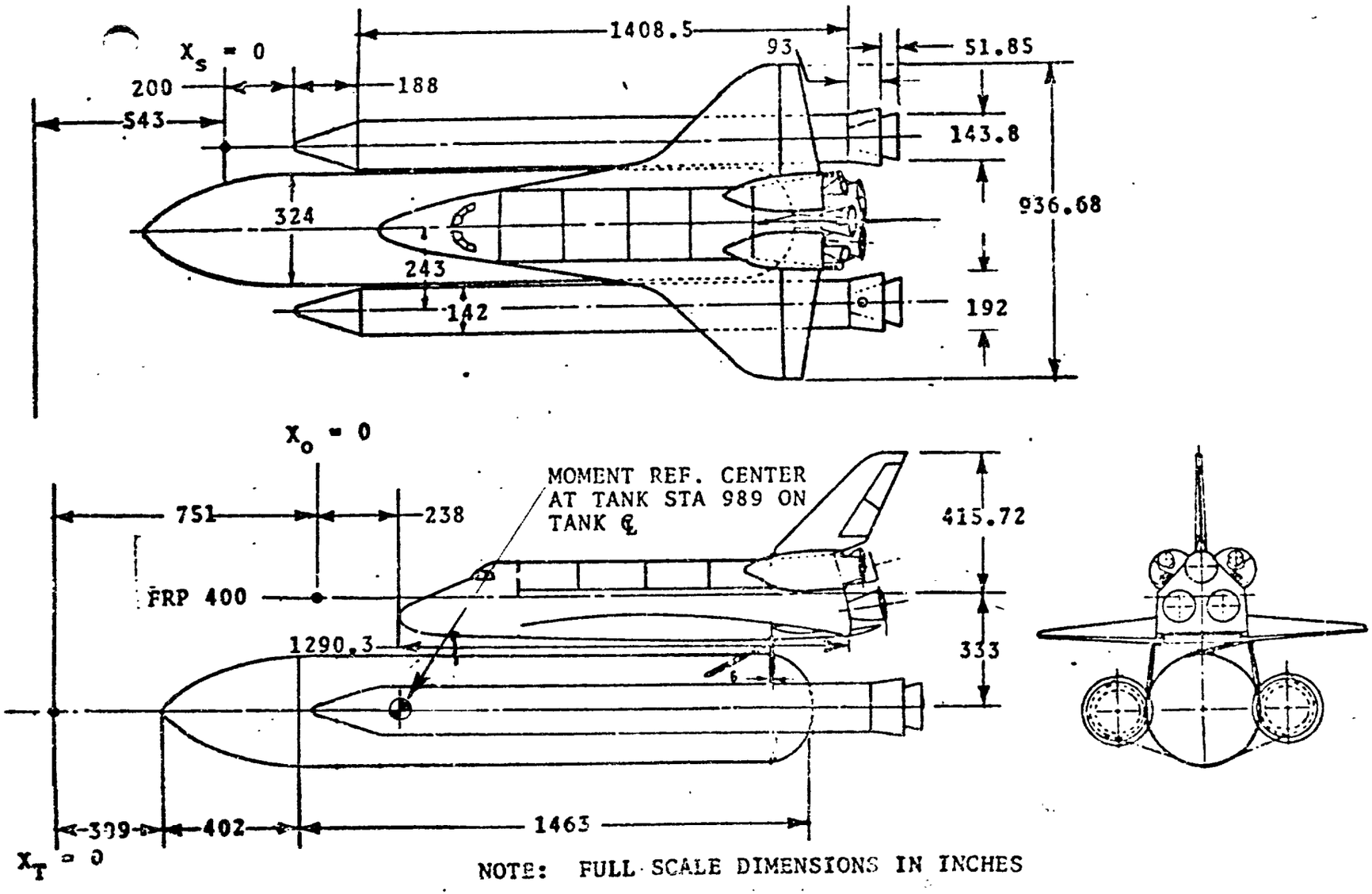


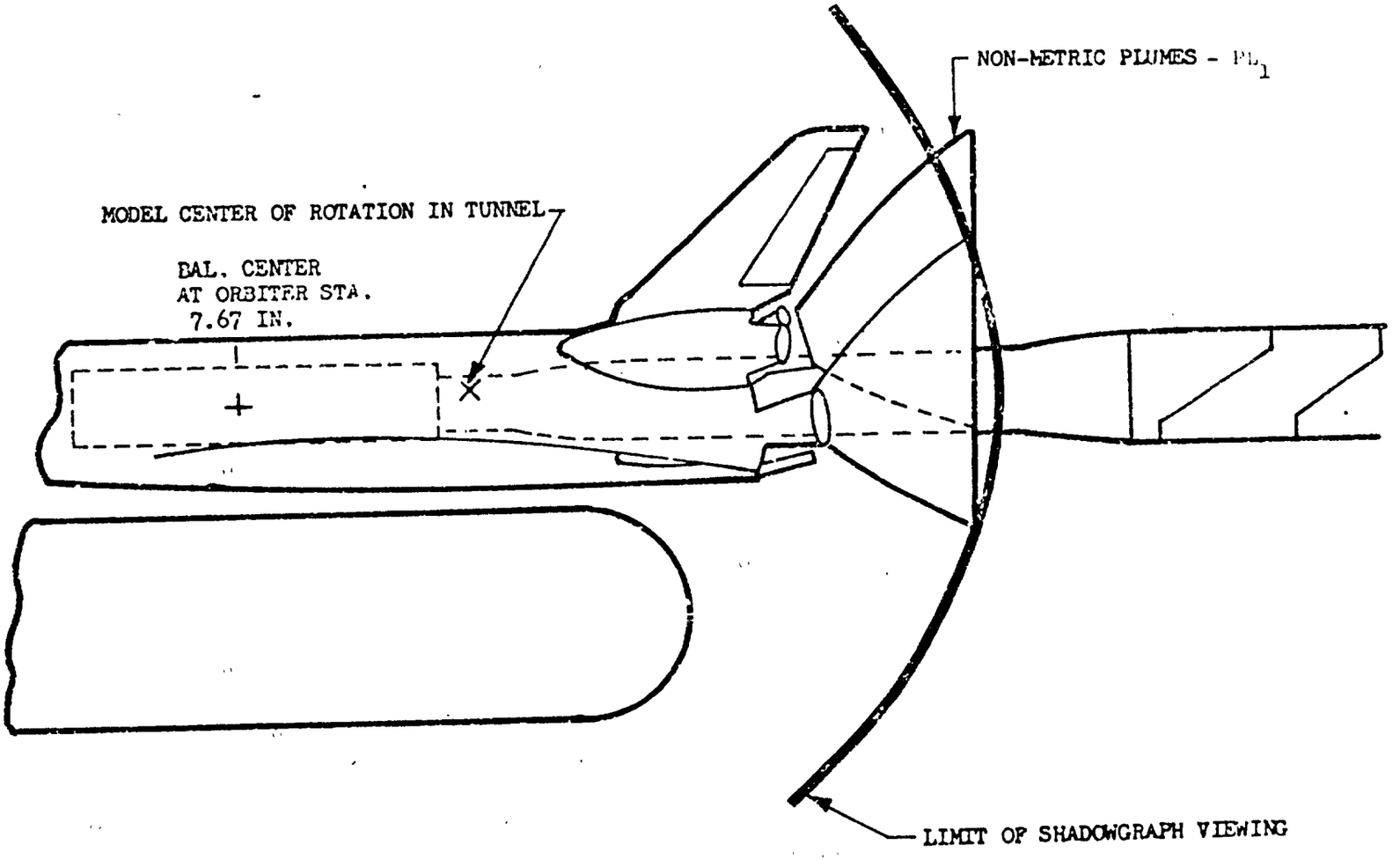
Figure 1. - Axis systems.



NOTE: FULL SCALE DIMENSIONS IN INCHES

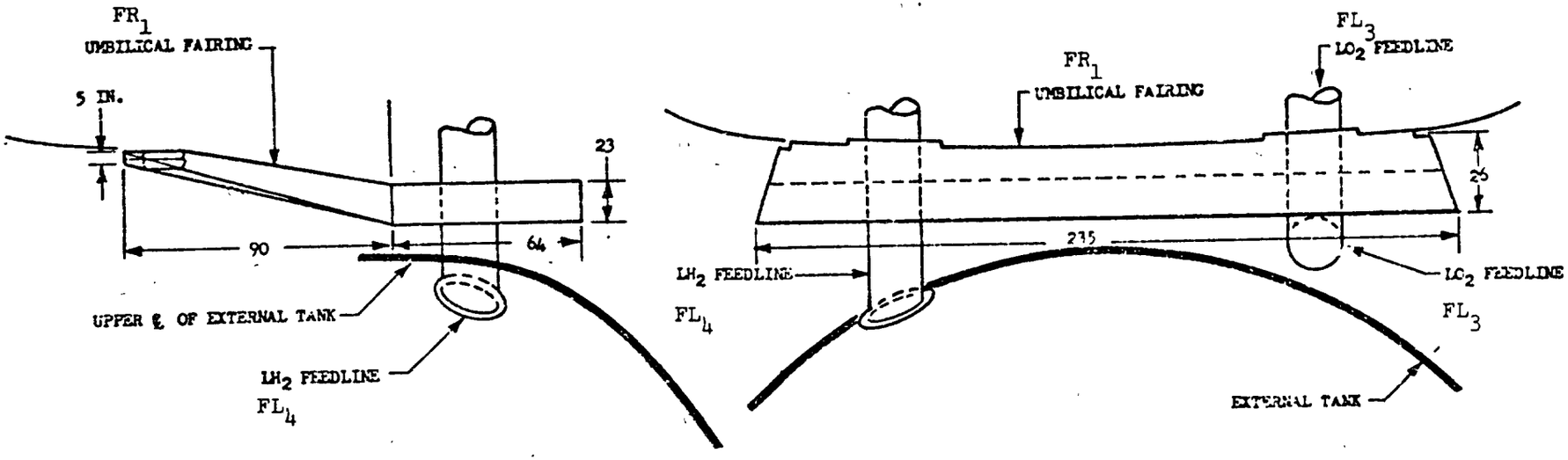
a. Integrated Vehicle Configuration 3 (Mated)

Figure 2. - Model sketches.



b. Model Installation with Non-Metric Plumes Included

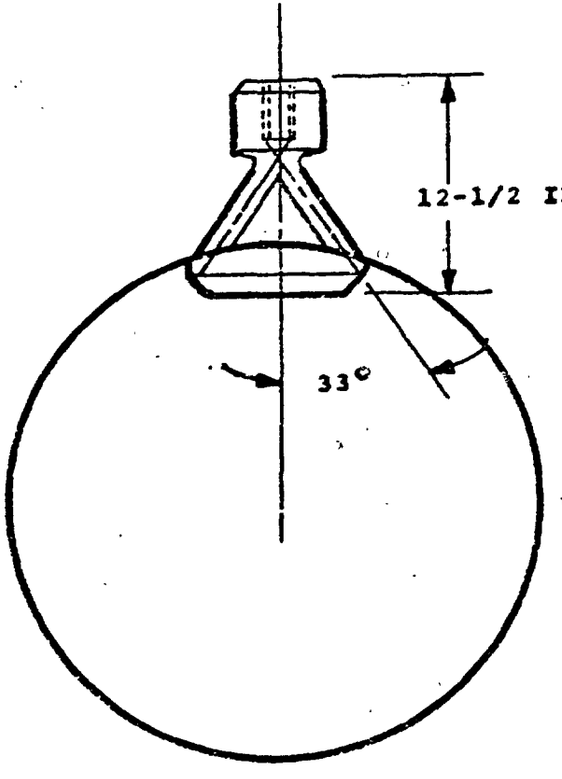
Figure 2. - Continued.



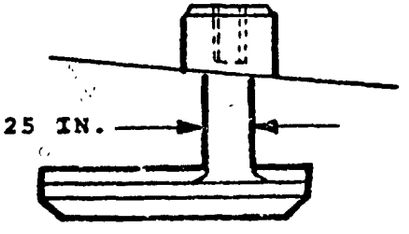
A NOTE: ALL DIMENSIONS ARE APPROXIMATE AND IN INCHES

c. Umbilical Fairing on Orbiter (FR_1)

Figure 2. – Continued.



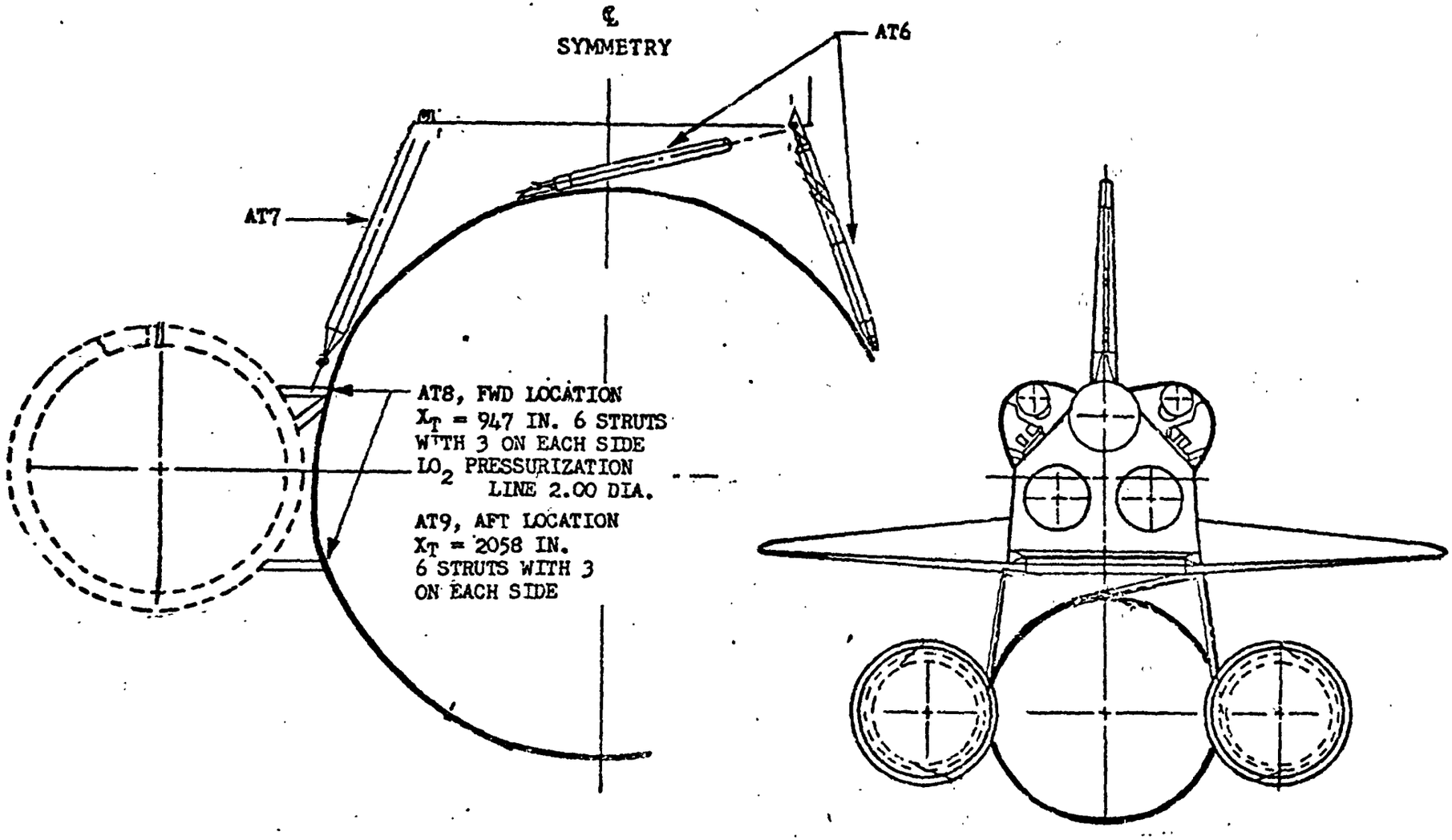
CONFIGURATION AT11



NOTE: CONFIGURATION AT11 IS THE SAME AS CONFIGURATION AT5 EXCEPT LEGS ARE 6 INCHES DIAMETER INSTEAD OF 12-1/2 BY 25 INCHES.

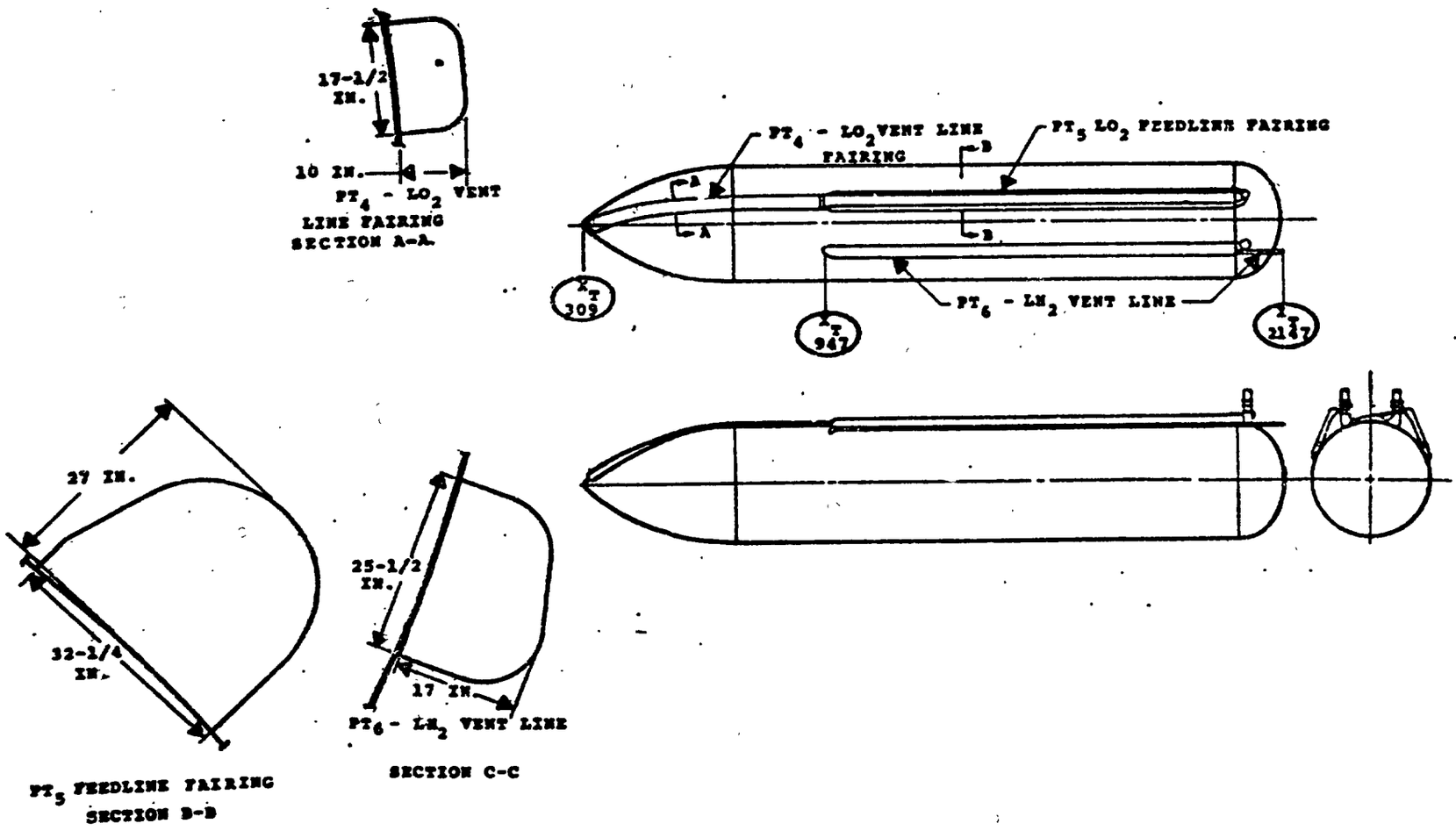
d. Forward Attachment of the External Tank to the Orbiter

Figure 2. - Continued.



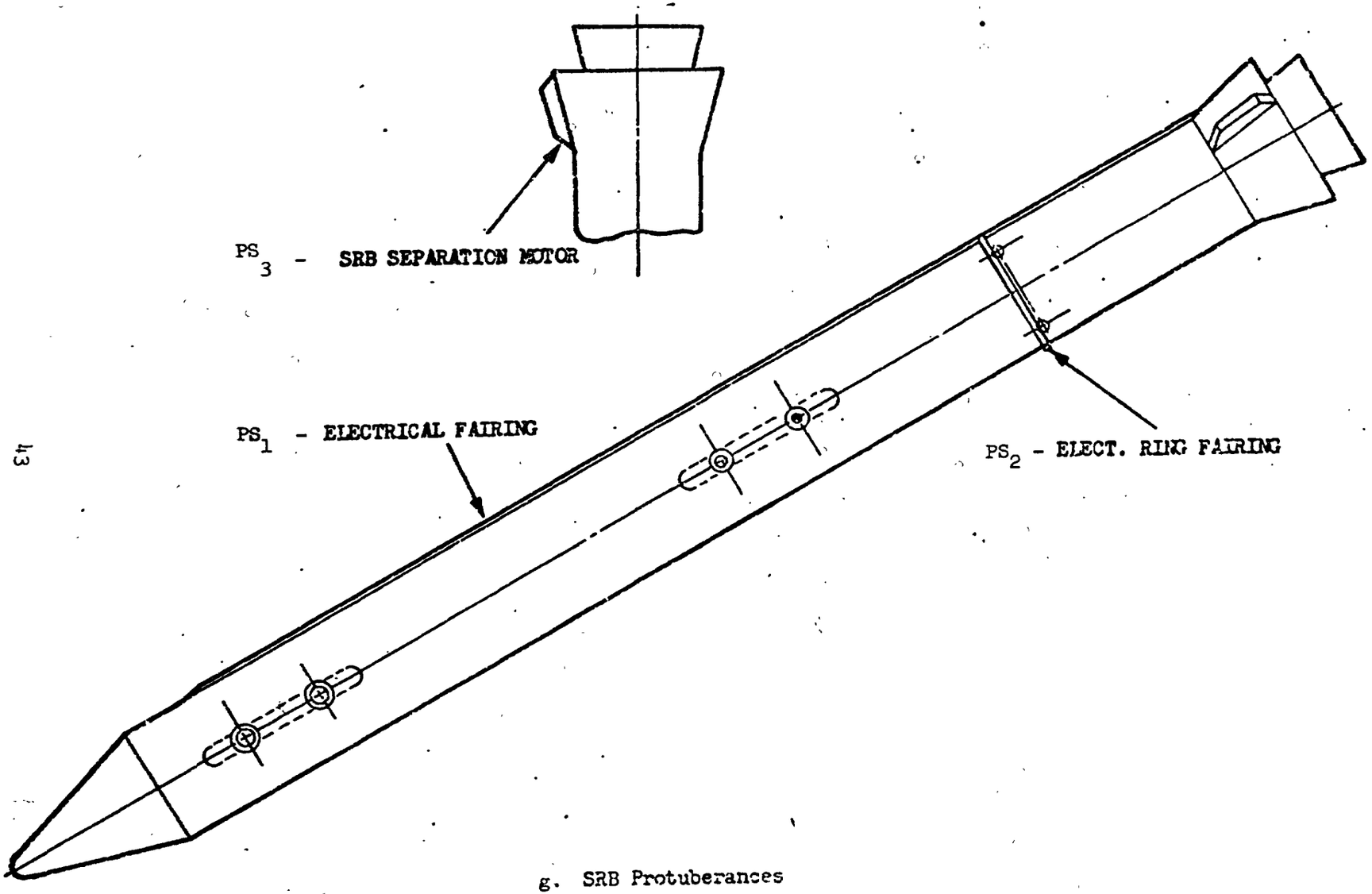
e. Attach Structure - VL72-000089 Configuration 3A

Figure 2. - Continued.



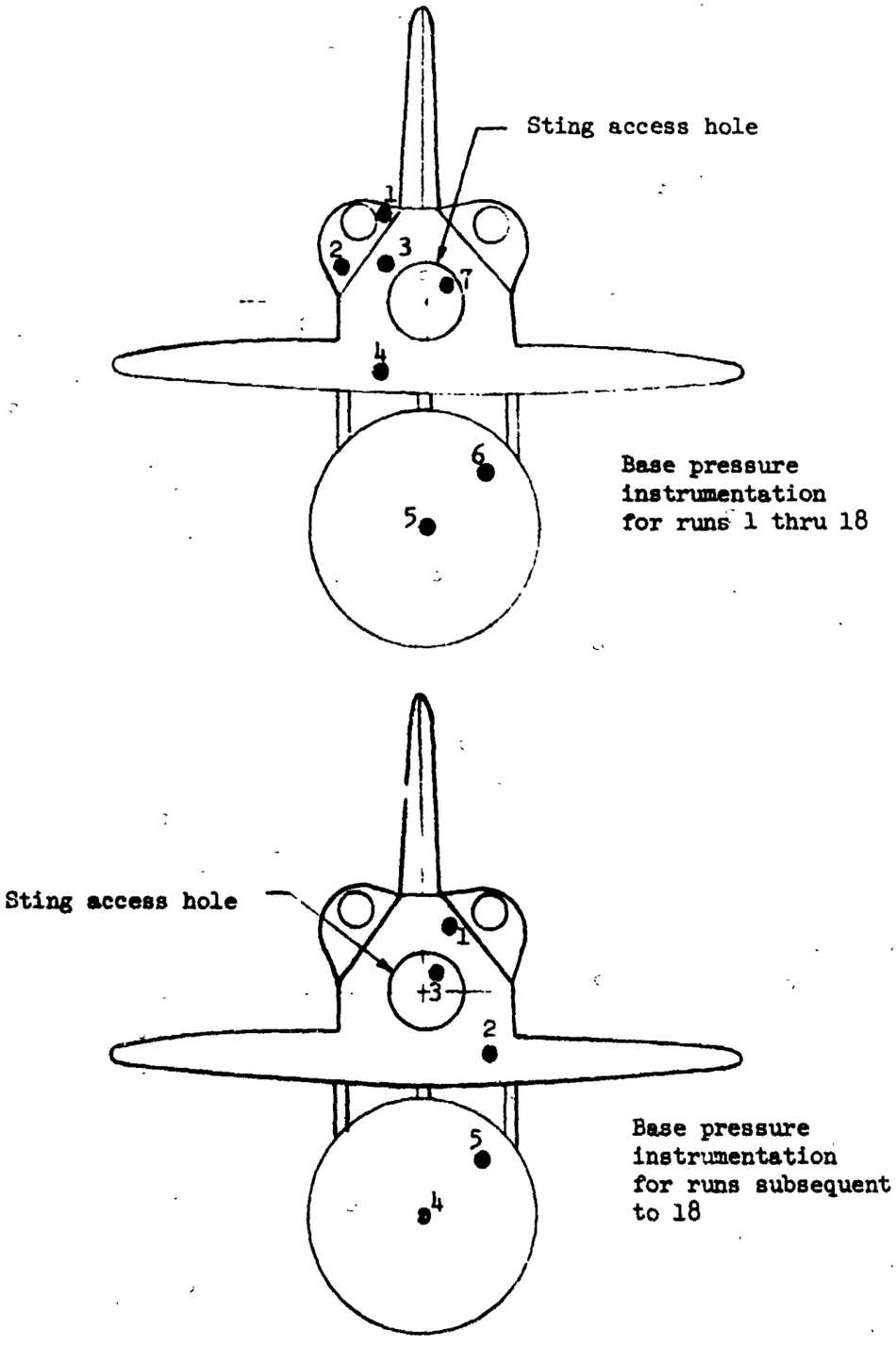
f. External Tank Protuberances

Figure 2. - Continued.



g. SRB Protuberances

Figure 2. - Continued.



h. Base pressure orifice locations.

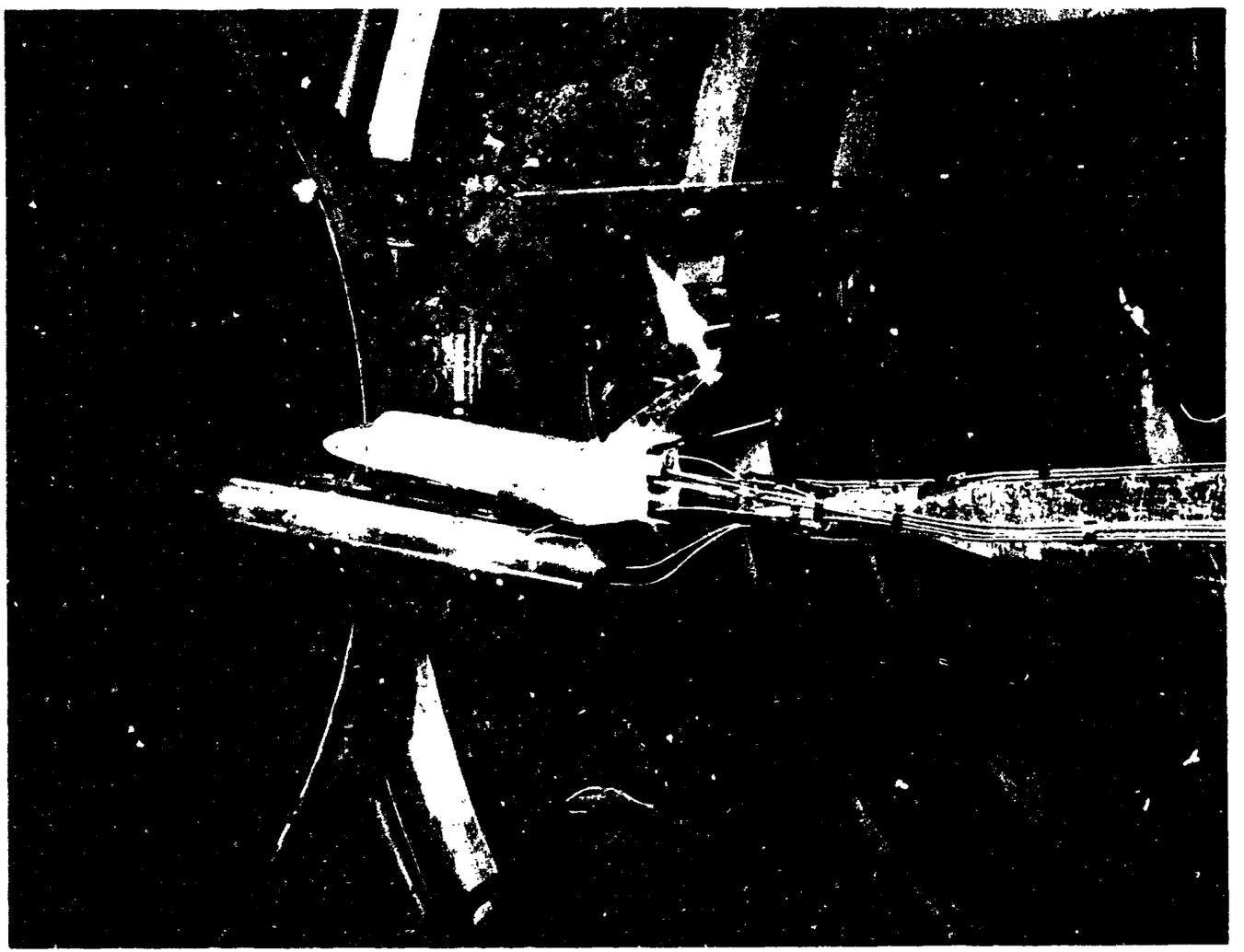
Figure 2. - Concluded.

(a) Close-up 3/4 rear view of 0.010-scale orbiter model 139B mounted on external tank

Figure 3. - Model photographs.

(b) Side view of 0.010-scale orbiter model 139B, external tank, sting, and strut

Figure 3. - Continued.



(c) Side view of 0.010-scale orbiter model 139B, external tank, and sting.

Figure 3. - Concluded.

DATA FIGURES

DATA SET SYMBOL		CONFIGURATION DESCRIPTION
(REG002)	8	AMES 3.5-175 IAI5 OT+L+PI+AI+F
(REG003)	8	AMES 3.5-175 IAI5 OT+L+PI+AI+F

RUDDER	AILRON	ELEVON	PLUMES
.000	.000	.000	.000
-20.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

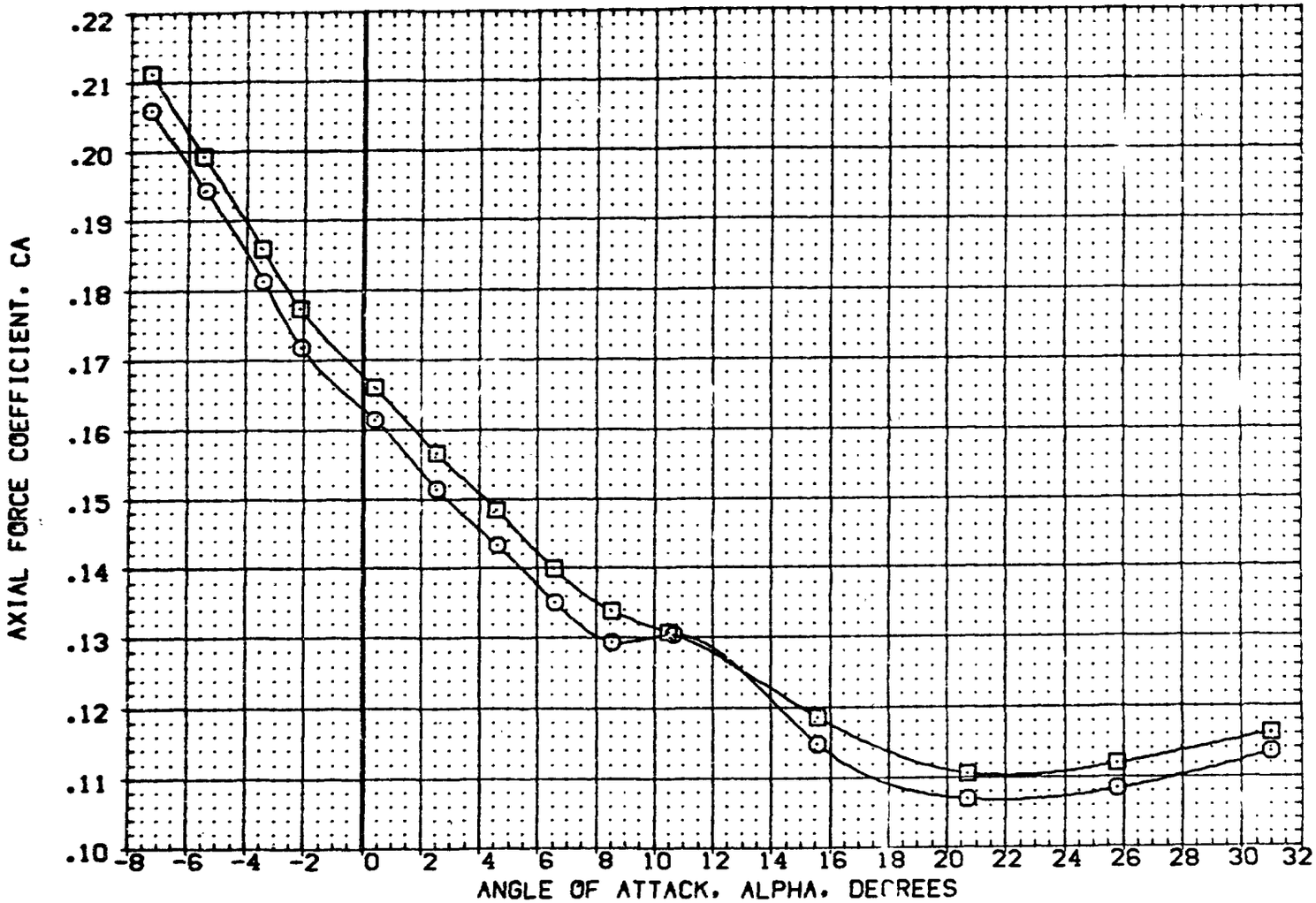


FIG. 4 RUDDER DEFLECTION WITH FAIRING, LONGITUDINAL.

(A)MACH = 7.32

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	RUDDER	AILRON	ELEVON	PITCHES
(REG002)	AMES 3.5-175 IA15 OT+L+PI+AI+F	.000	.000	.000	.000
(REG003)	AMES 3.5-175 IA15 OT+L+PI+AI+F	-20.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

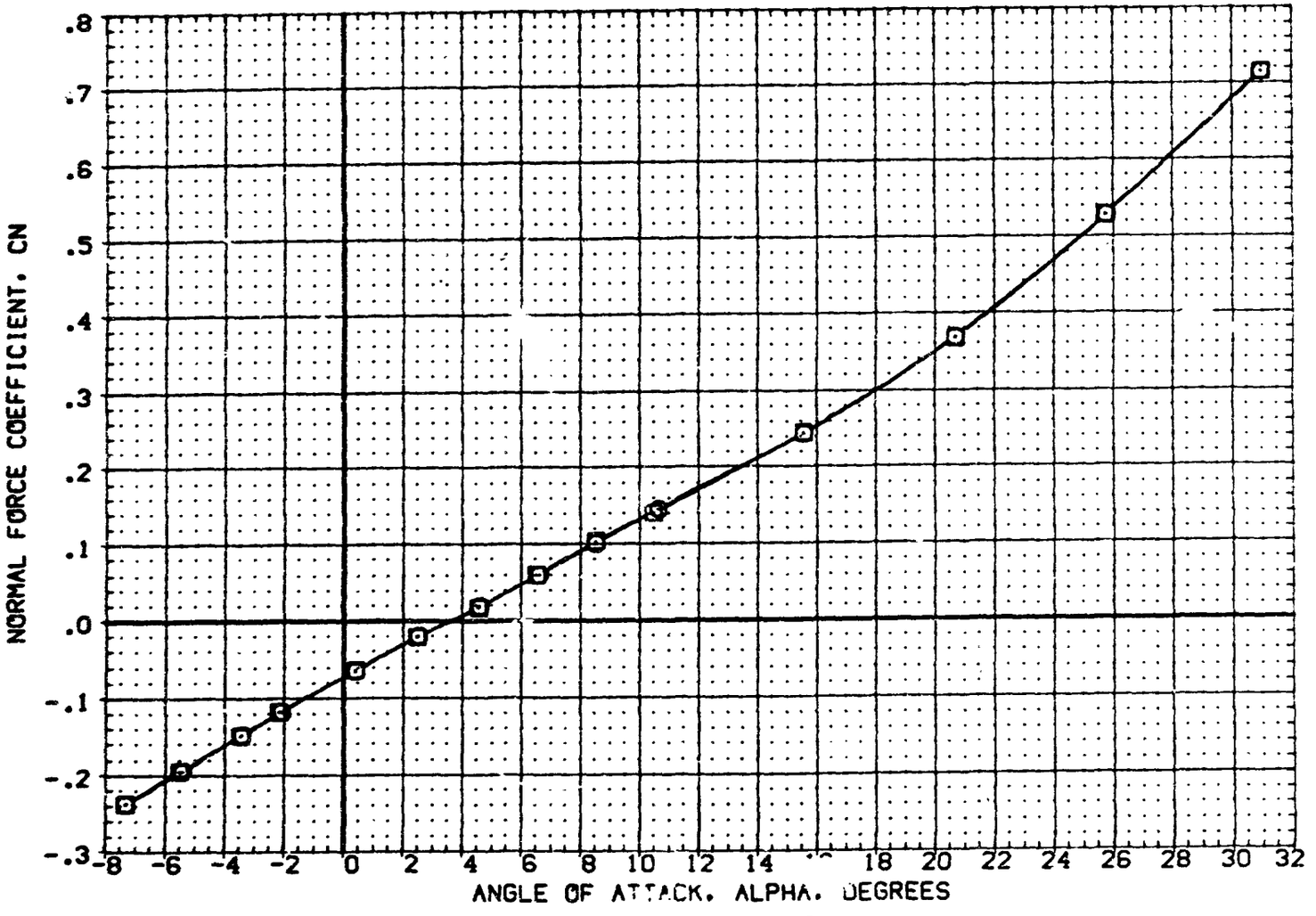


FIG. 4 RUDDER DEFLECTION WITH FAIRING, LONGITUDINAL.

(A) MACH = 7.32

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(REG002)	8	AMES 3.5-175 IA15 OT+L+P1+A1+F
(REG003)	B	AMES 3.5-175 IA15 OT+L+P1+A1+F

RUDDER	AILRON	ELEVON	PLUMES
.000	.000	.000	.000
-20.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

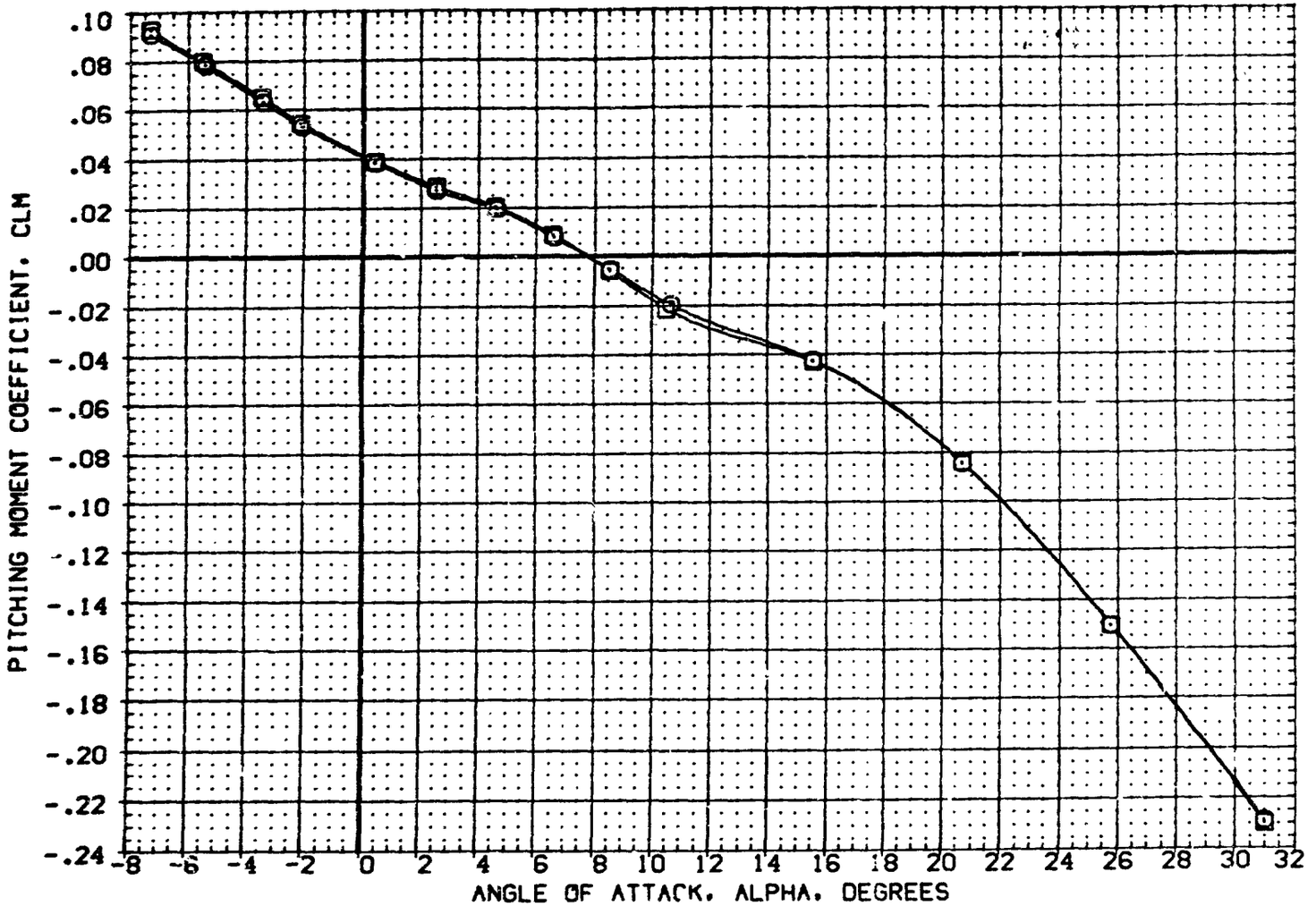


FIG. 4 RUDDER DEFLECTION WITH FAIRING, LONGITUDINAL.

(A)MACH = 7.32

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	RUDDER	AILRON	ELEVON	PLUMES
(REG002)	AMES 3.5-175 IA15 OT+L+PI+AI+F	.000	.000	.000	.000
(REG003)	AMES 3.5-175 IA15 OT+L+PI+AI+F	-20.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

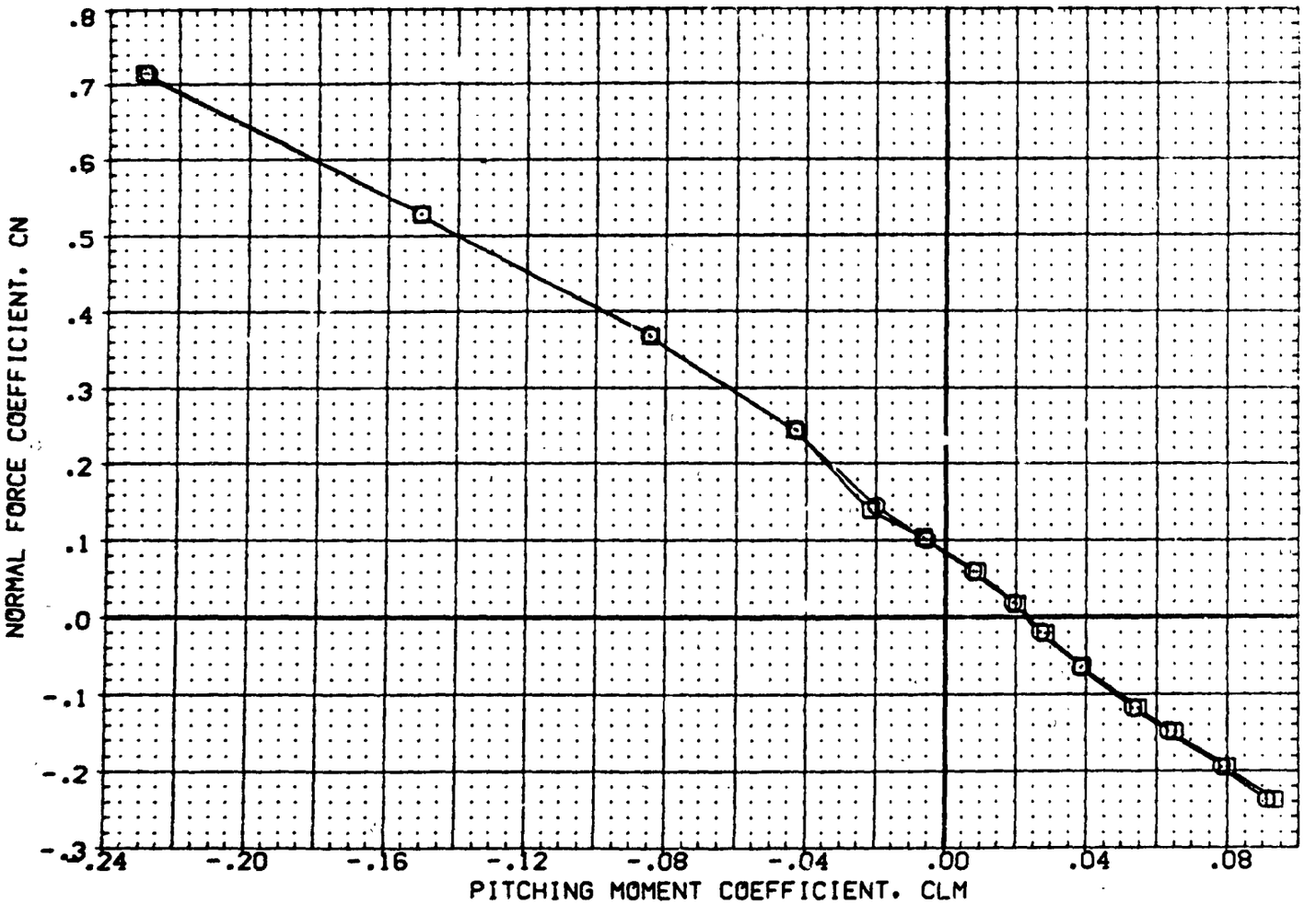


FIG. 4 RUDDER DEFLECTION WITH FAIRING, LONGITUDINAL.

(A)MACH = 7.32

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	RUDDER	AILRON	ELEVON	PLUMES
(REG014)	AMES 3.5-175 IA15 OT+L+P1+A1+F	.000	.000	.000	.000
(REG015)	AMES 3.5-175 IA15 OT+L+P1+A1+F	-20.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

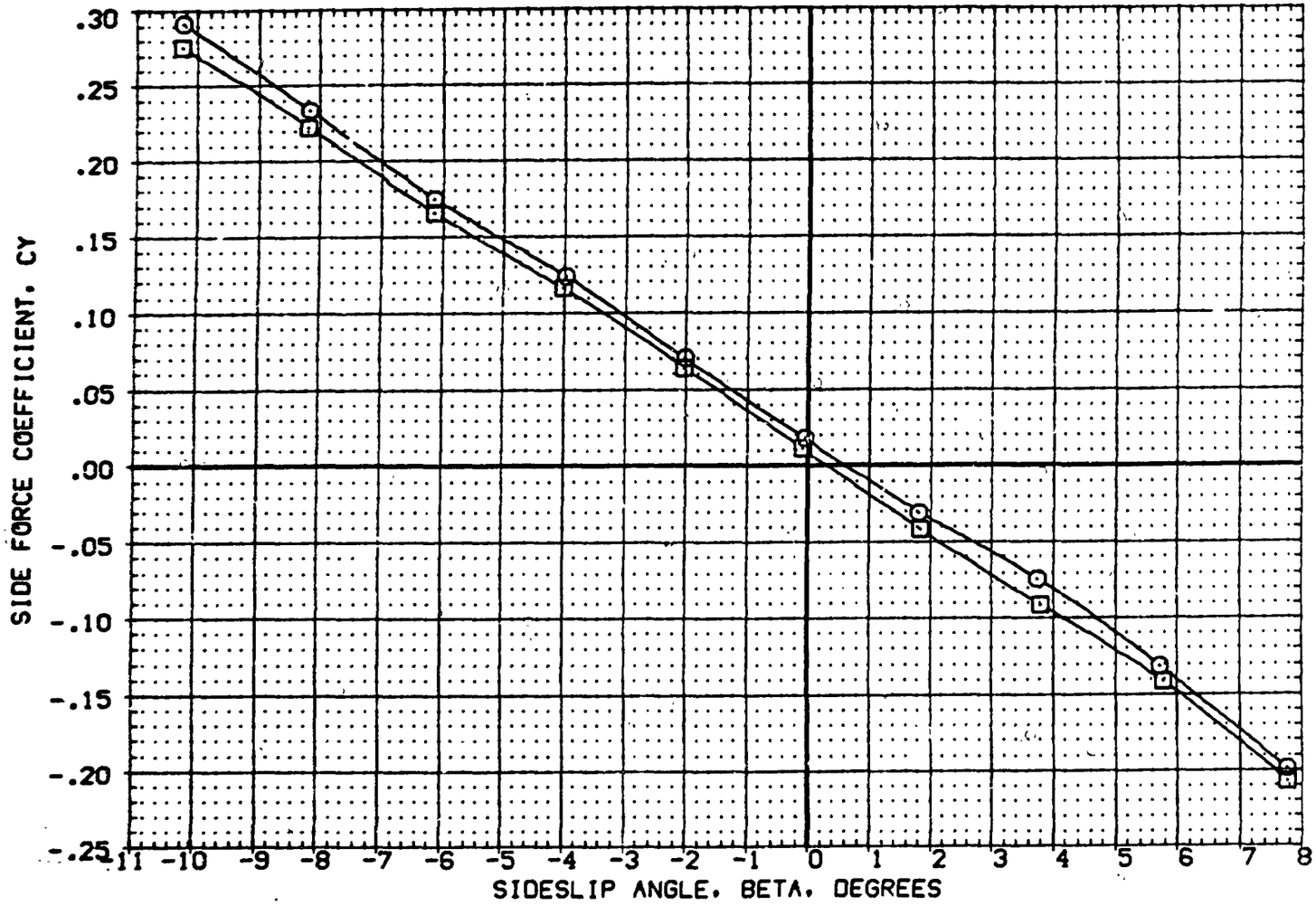


FIG. 5 RUDDER DEFLECTION WITH FAIRING, LATERAL-DIRECTIONAL.

(A)MACH = 7.32

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(REGG14) ○	AMES 3.5-175 IAI5 OT+L+P1+A1+F
(REGG15) □	AMES 3.5-175 IAI5 OT+L+P1+A1+F

RUDDER	AILRON	ELEVON	PLUMES
.000	.000	.000	.000
-20.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

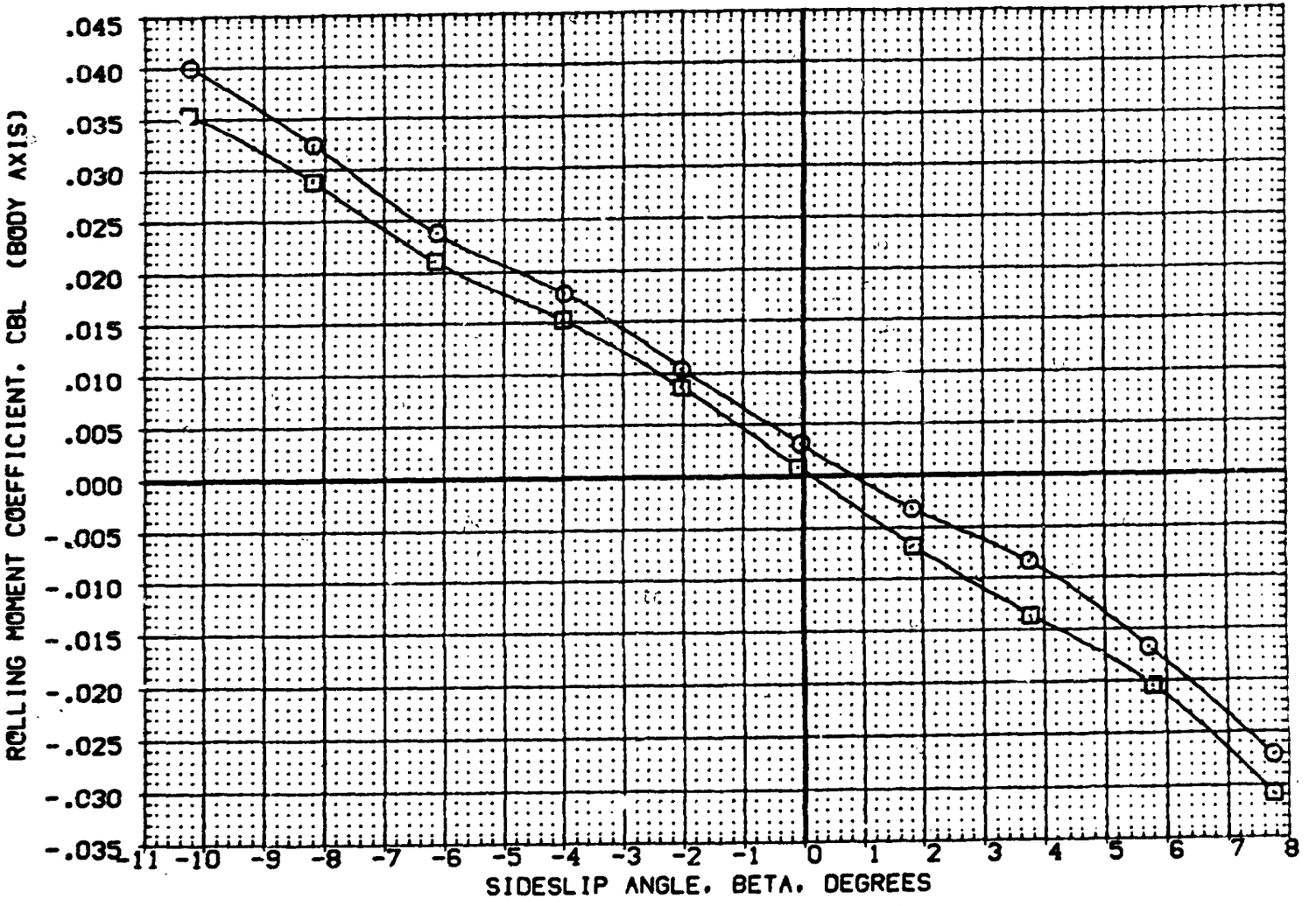


FIG. 5 RUDDER DEFLECTION WITH FAIRING, LATERAL-DIRECTIONAL.

(A)MACH = 7.32

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	RUDDER	AILRON	ELEVON	PLUMES
(REG014)		AMES 3.5-175 IA15 OT+L+P1+A1+F	.000	.000	.000	.000
(REG015)		AMES 3.5-175 IA15 OT+L+P1+A1+F	-20.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

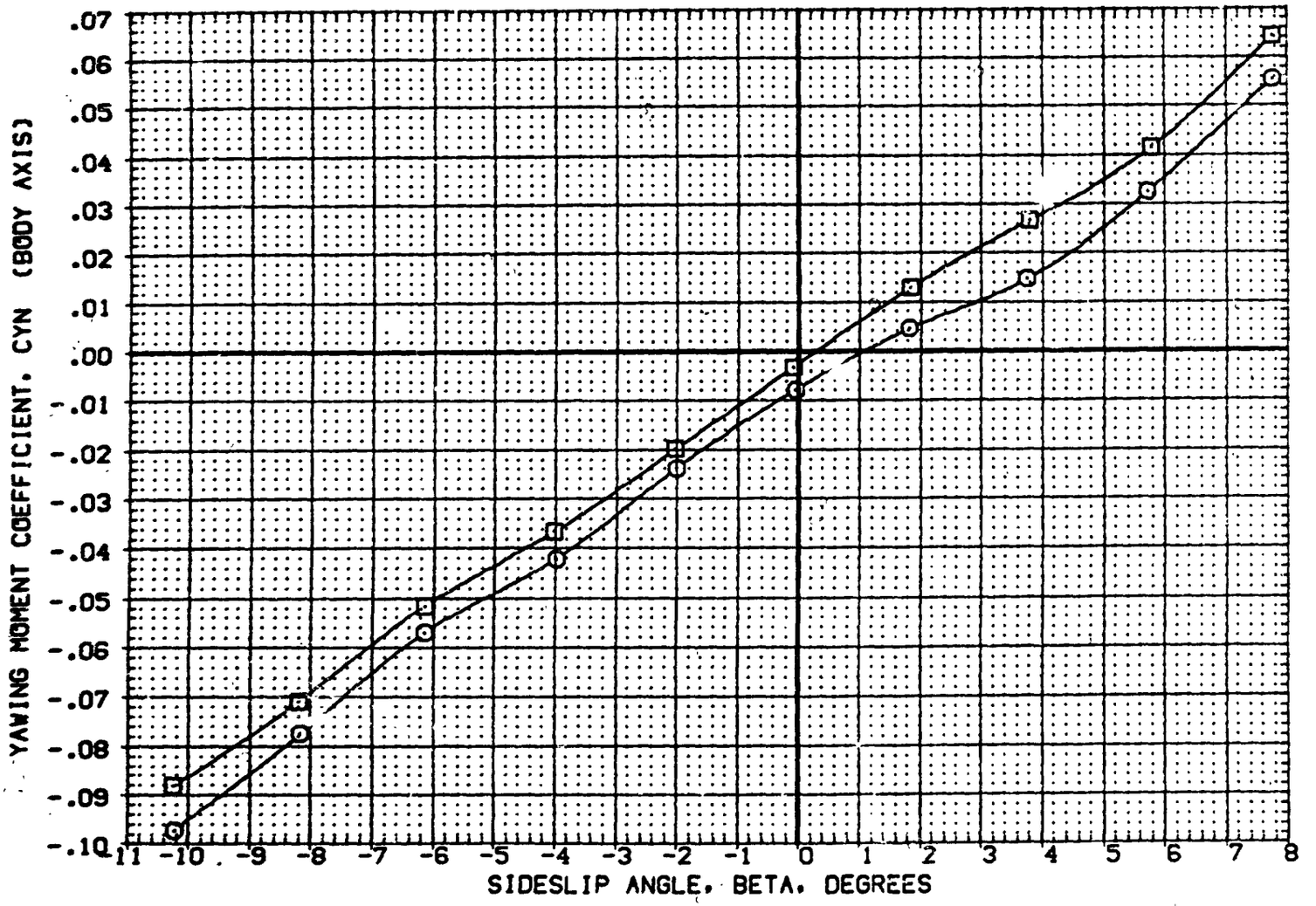


FIG. 5 RUDDER DEFLECTION WITH FAIRING, LATERAL-DIRECTIONAL.

(A)MACH = 7.32

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	RUDDER	AILRON	ELEVON	PLUMES
(REG014)		AMES 3.5-17S (A15 OT+L+P1+A1+F	.000	.000	.000	.000
(REG015)		AMES 3.5-17S (A15 OT+L+P1+A1+F	-20.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

FIG. 5 RUDDER DEFLECTION WITH FAIRING, LATERAL-DIRECTIONAL.

(A)MACH = 7.32

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(REG006)	○	AMES 3.5-175 (A15 OT+L+P1+A1
(REG007)	□	AMES 3.5-175 (A15 OT+L+P1+A1
(REG008)	◇	AMES 3.5-175 (A15 OT+L+P1+A1
(REG010)	△	AMES 3.5-175 (A15 OT+L+P1+A1

RUDDER	AILRON	ELEVON	PLUMES
.000	.000	15.000	.000
.000	.000	-40.000	.000
.000	.000	-20.000	.000
.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

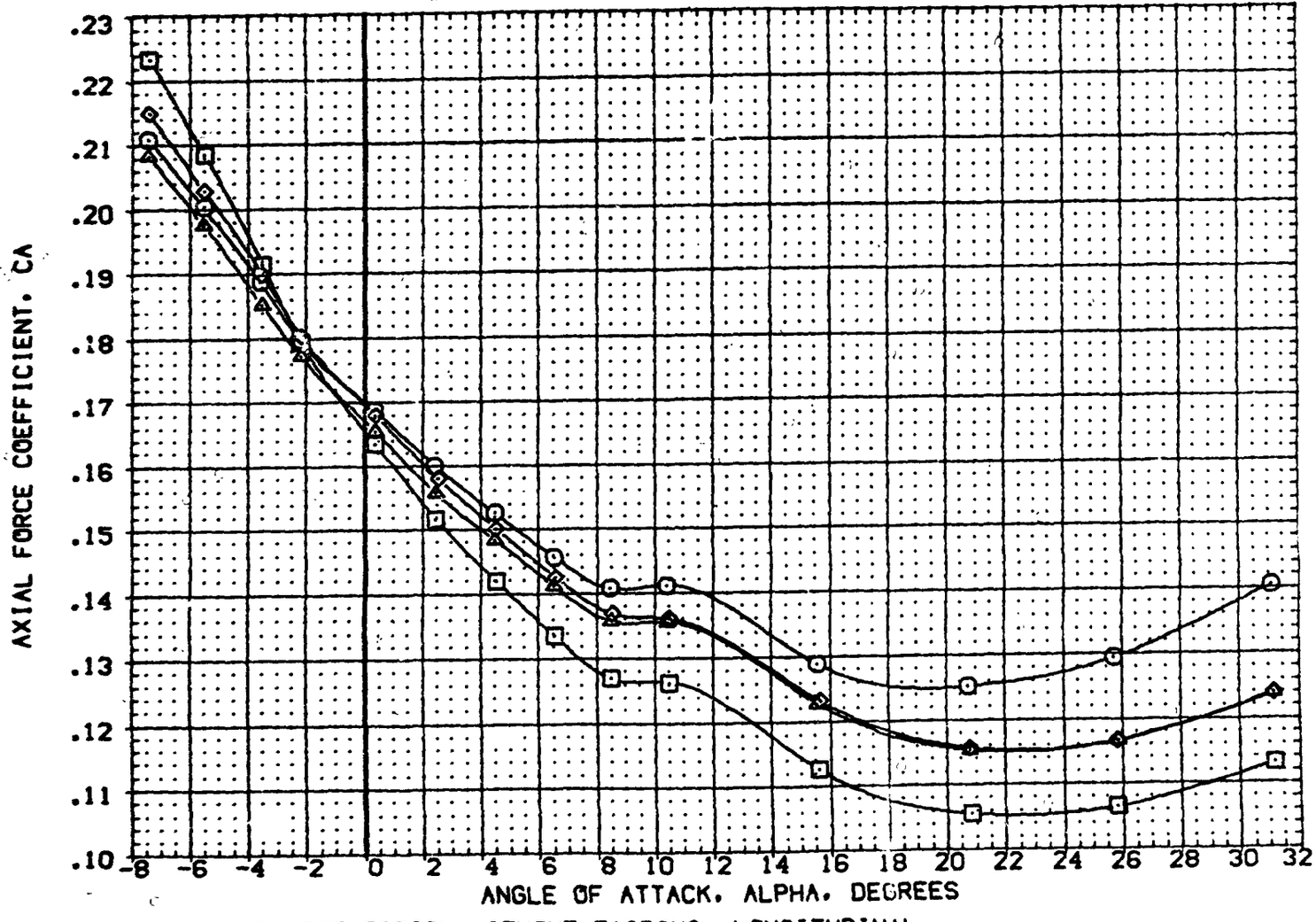


FIG. 6 ELEVON DEFLECTION WITHOUT FAIRING, LONGITUDINAL.

(A)MACH = 7.32

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	RUDDER	AILRON	ELEVON	PLUMES
(REG006)	○	AMES 3.5-175 IA15 OT+L+P1+A1	.000	.000	15.000	.000
(REG007)	□	AMES 3.5-175 IA15 OT+L+P1+A1	.000	.000	-40.000	.000
(REG008)	⊗	AMES 3.5-175 IA15 OT+L+P1+A1	.000	.000	-20.000	.000
(REG010)	△	AMES 3.5-175 IA15 OT+L+P1+A1	.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

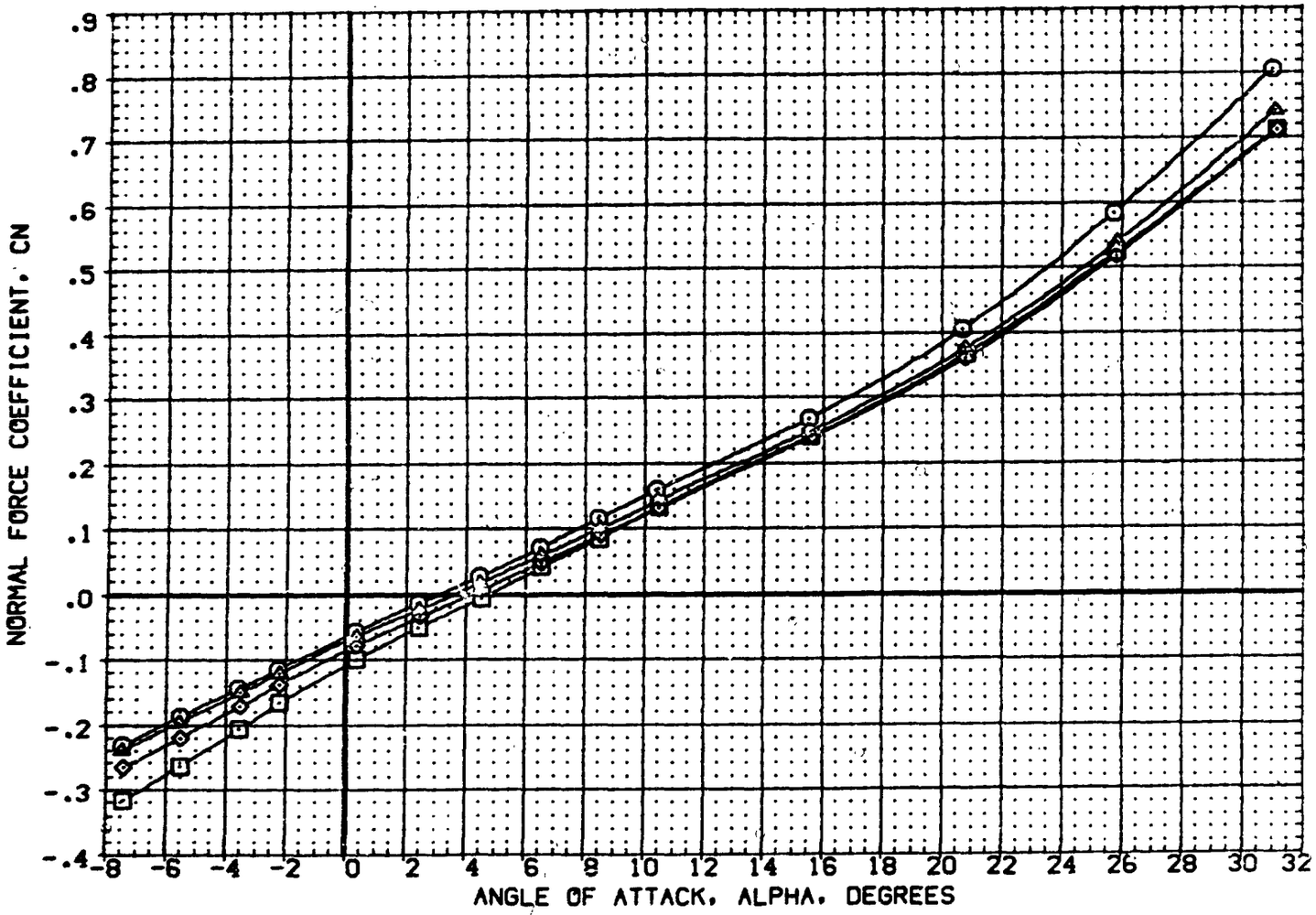


FIG. 6 ELEVON DEFLECTION WITHOUT FAIRING, LONGITUDINAL.

(A)MACH = 7.32

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(REG006)	○	AMES 3.5-175 IAIS OT+L+P1+A1
(REG007)	□	AMES 3.5-175 IAIS OT+L+P1+A1
(REG008)	◇	AMES 3.5-175 IAIS OT+L+P1+A1
(REG010)	△	AMES 3.5-175 IAIS OT+L+P1+A1

RUDDER	AILRON	ELEVON	PLUMES
.000	.000	15.000	.000
.000	.000	-40.000	.000
.000	.000	-20.000	.000
.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

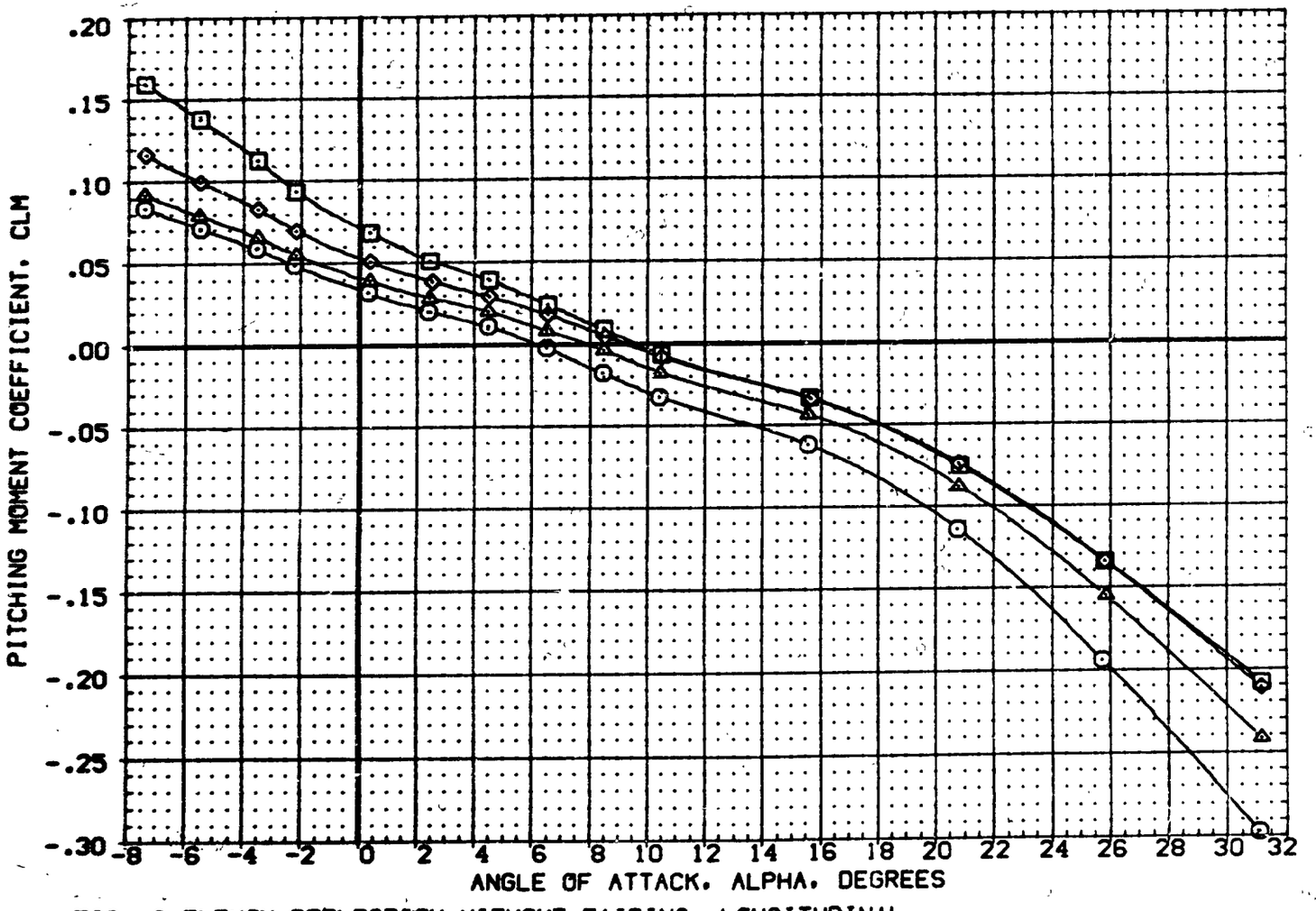


FIG. 6 ELEVON DEFLECTION WITHOUT FAIRING, LONGITUDINAL.

(A)MACH = 7.32

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	RUDDER	AILRON	ELEVON	PLUMES
(REG006)	□	AMES 3.5-175 IAIS OT+L+PI+AI	.000	.000	15.000	.000
(REG007)	⊠	AMES 3.5-175 IAIS OT+L+PI+AI	.000	.000	-40.000	.000
(REG008)	⋈	AMES 3.5-175 IAIS OT+L+PI+AI	.000	.000	-20.000	.000
(REG010)	△	AMES 3.5-175 IAIS OT+L+PI+AI	.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

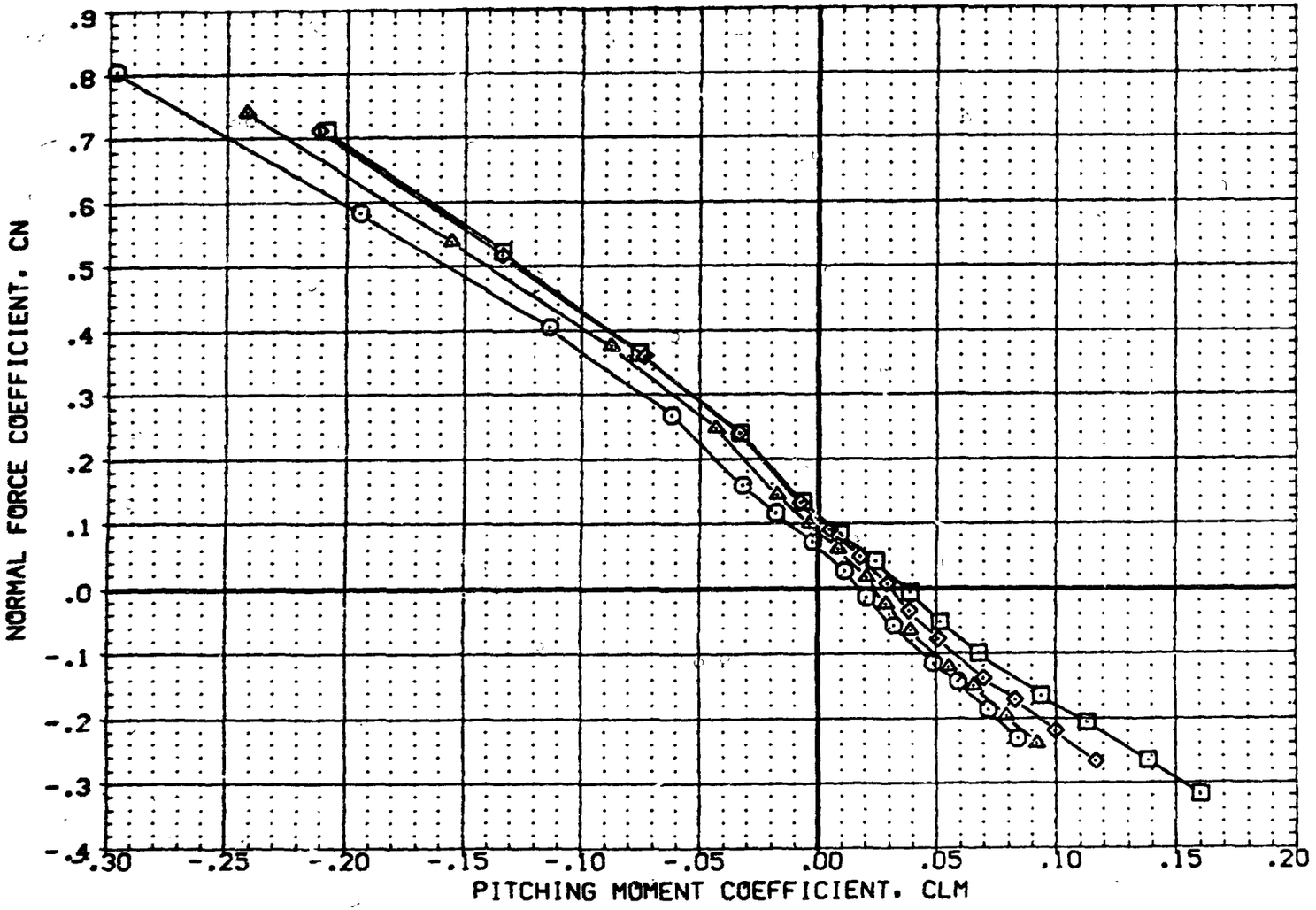


FIG. 6 ELEVON DEFLECTION WITHOUT FAIRING, LONGITUDINAL.

(A)MACH = 7.32

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	RUDDER	AILRON	ELEVON	PLUMES
(REG009)	AMES 3.5-175 IAIS OT+L+P1+A1	.000	10.000	.000	.000
(REG010)	AMES 3.5-175 IAIS OT+L+P1+A1	.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

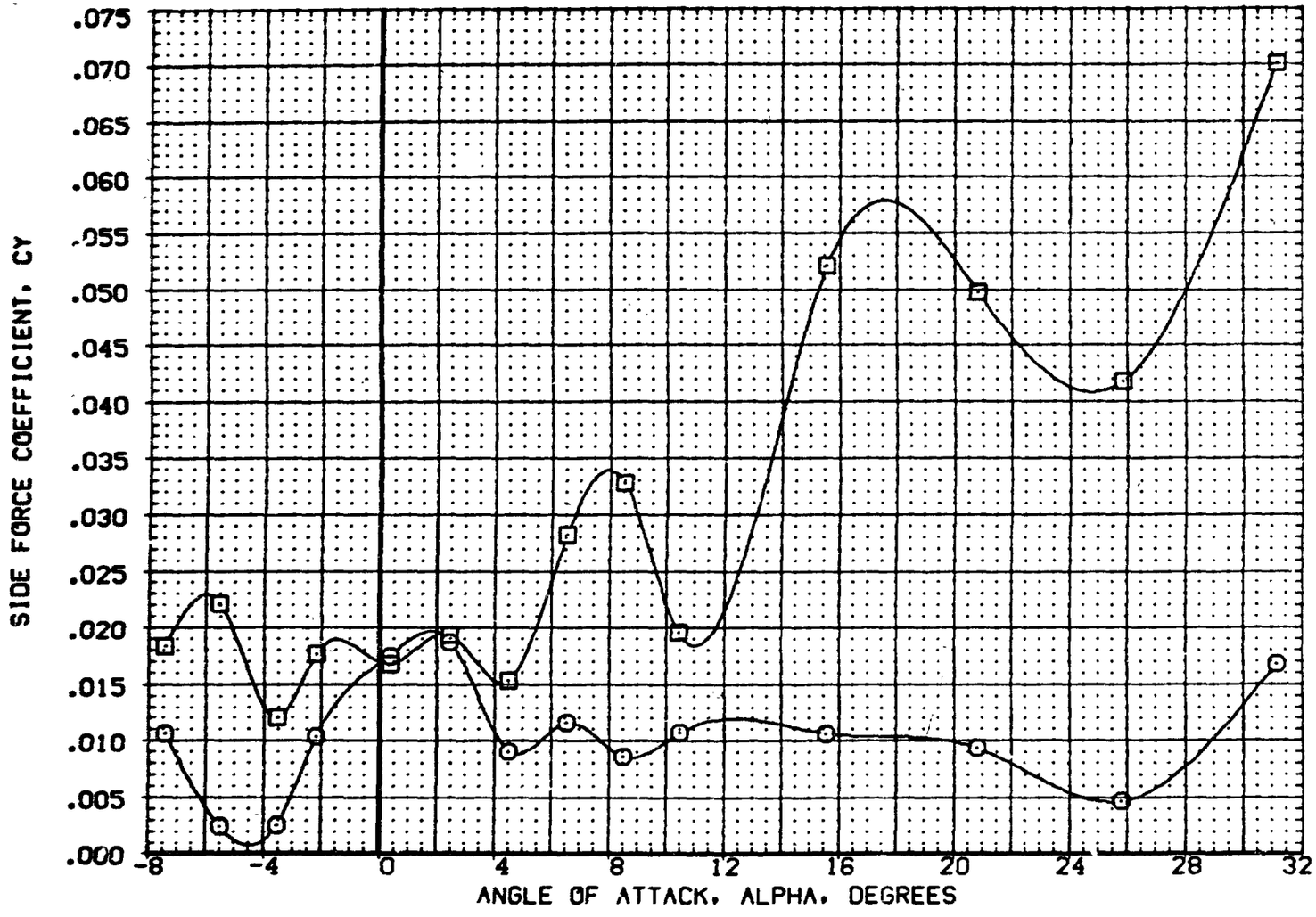


FIG. 7 AILERON DEFLECTION FAIRING, LATERAL-DIRECTIONAL.

(A)MACH = 7.32

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(REG009)	⊟	AMES 3.5-175 IA15 BT+L+PI+AI
(REG010)	⊟	AMES 3.5-175 IA15 BT+L+PI+AI

RUDDER	AILRON	ELEVON	PLUMES
.000	10.000	.000	.000
.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

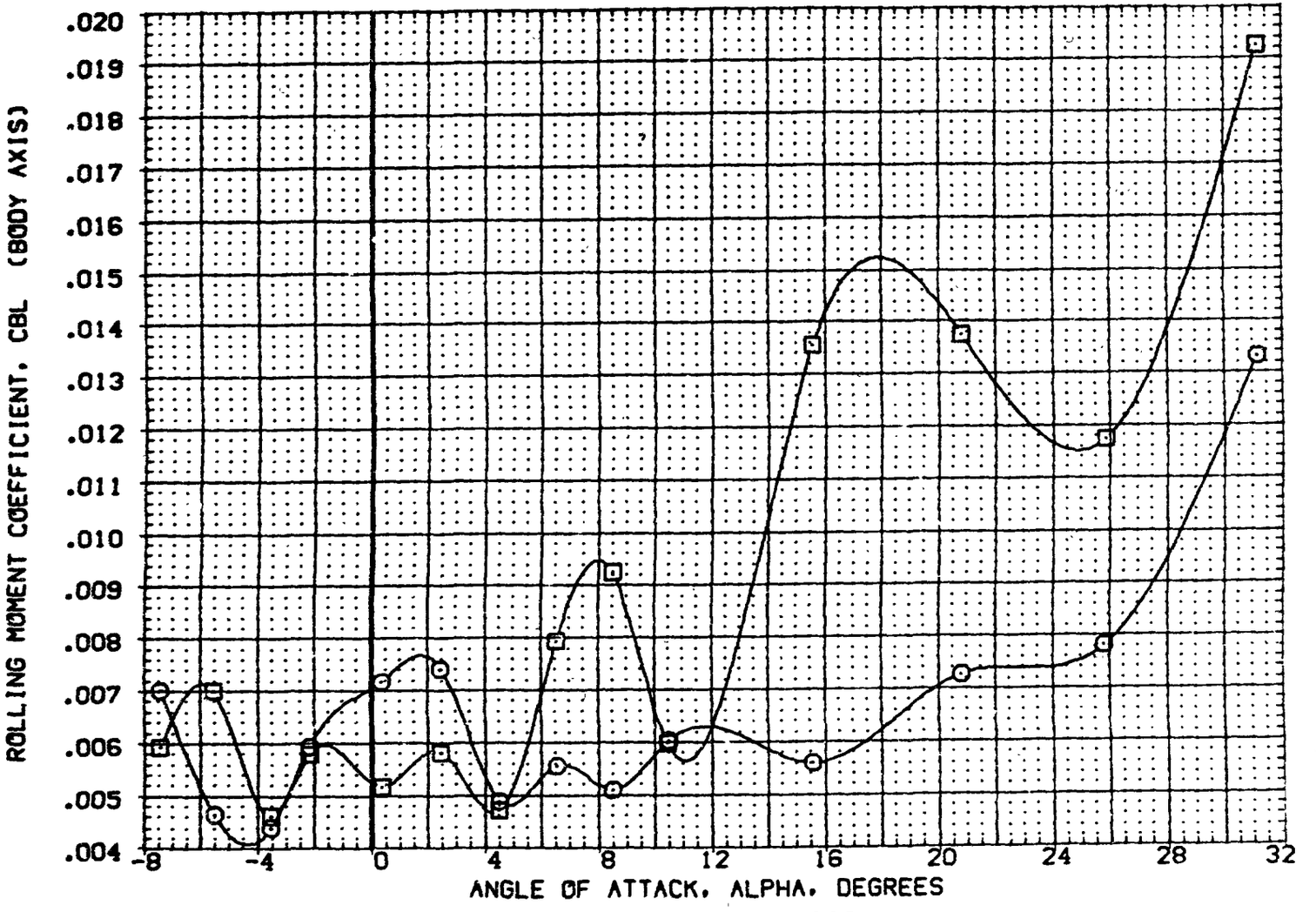


FIG. 7 AILERON DEFLECTION FAIRING, LATERAL-DIRECTIONAL.

(A)MACH = 7.32

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	RUDDER	AILRON	ELEVON	PLUMES
(REG009)	AMES 3.5-175 IA15 OT+L+P1+A1	.000	10.000	.000	.000
(REG010)	AMES 3.5-175 IA15 OT+L+P1+A1	.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

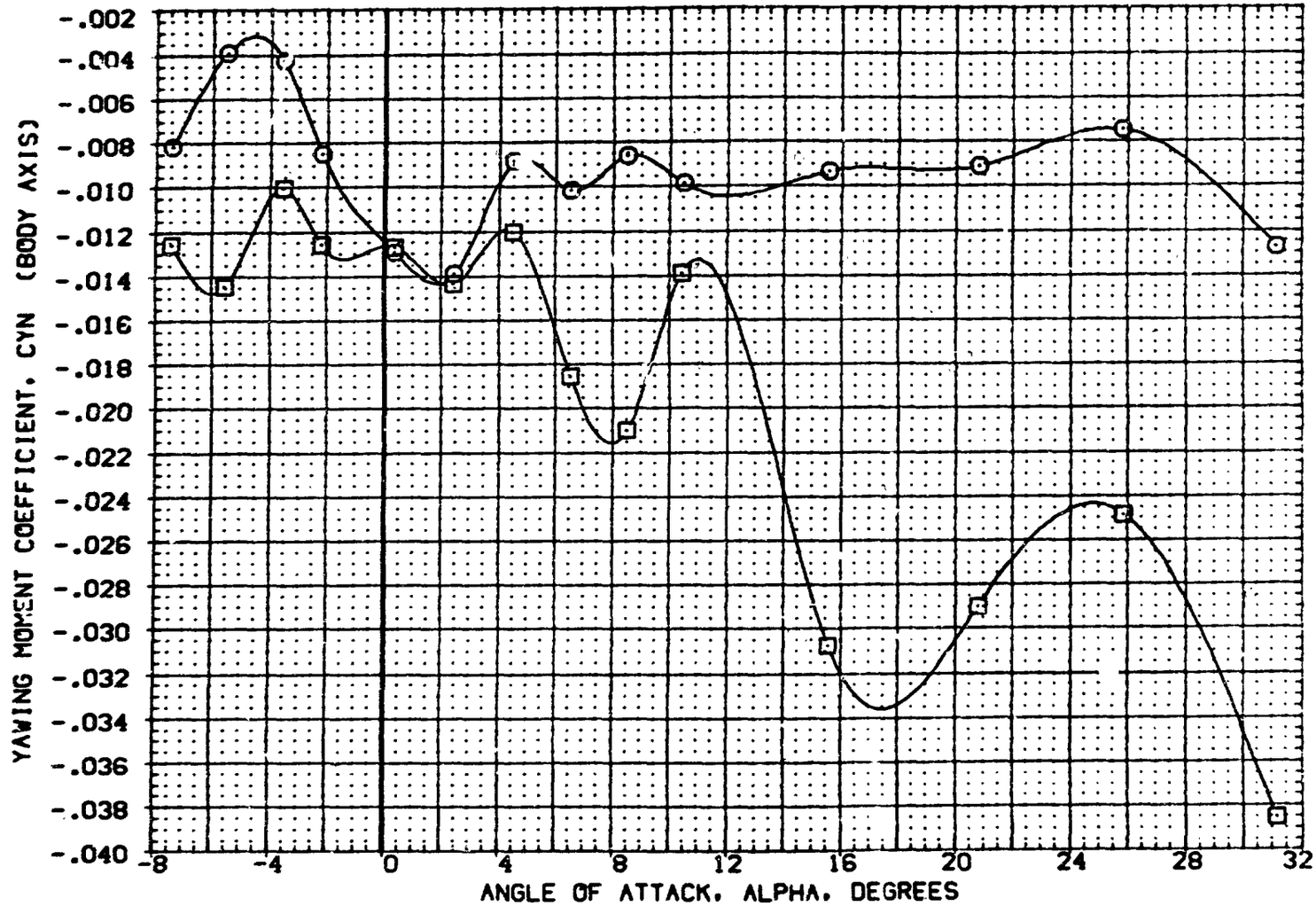


FIG. 7 AILERON DEFLECTION FAIRING, LATERAL-DIRECTIONAL.

(A)MACH = 7.32

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION		RUDDER	AILRON	ELEVON	PLUMES
(REG010)	○	AMES 3.5-175 IA15 OT+L+P1+A1		.000	.000	.000	.000
(REG002)	□	AMES 3.5-175 IA15 OT+L+P1+A1+F		.000	.000	.000	.000
(REG022)	◇	AMES 3.5-175 IA15 OT+L+P1+A1	PLUMES ON	.000	.000	.000	1.000
(REG024)	△	AMES 3.5-175 IA15 OT+L+P1+A1+F	PLUMES ON	.000	.000	.000	1.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

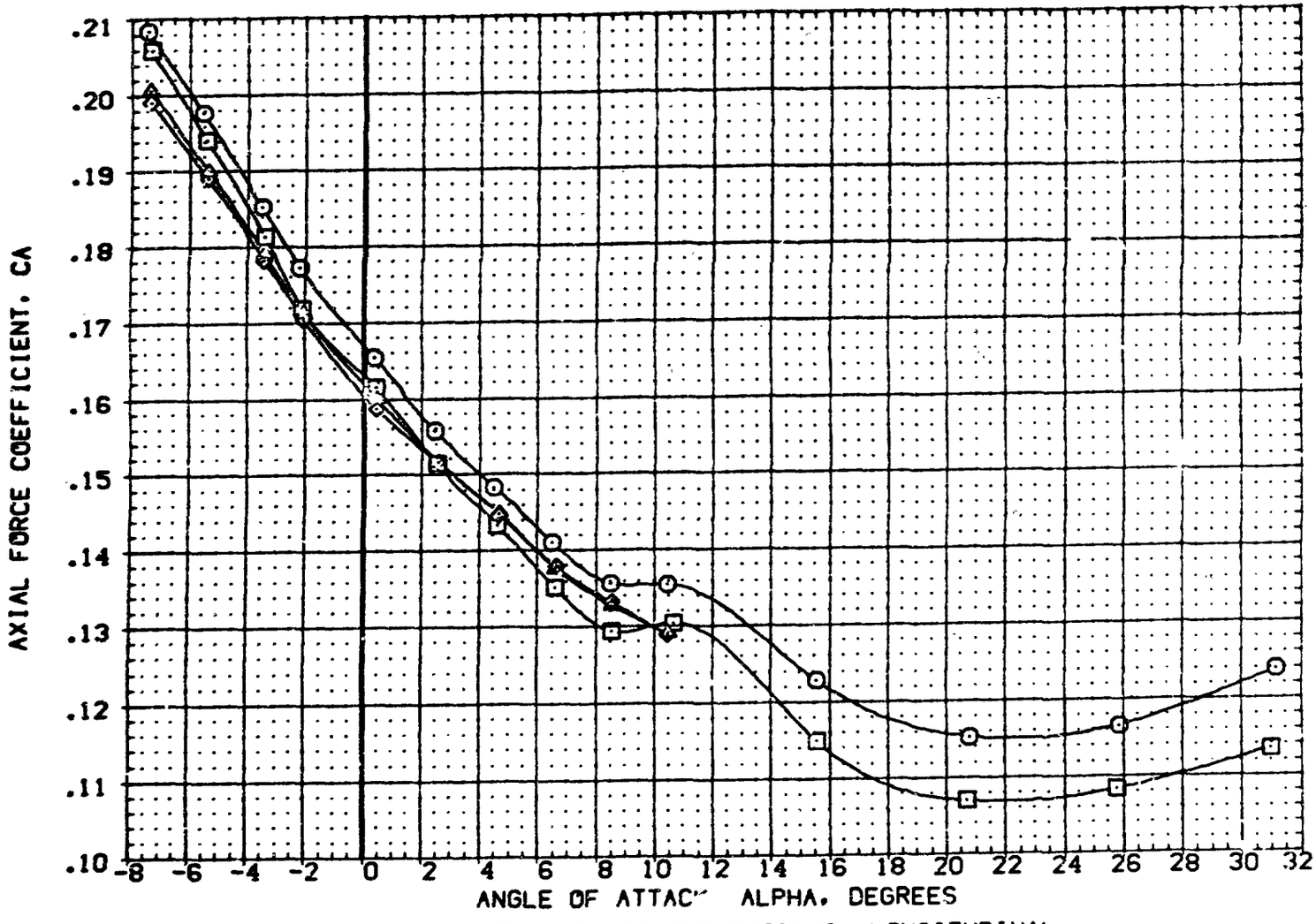


FIG. 8 POWER ON AND OFF, WITH AND WITHOUT FAIRING, LONGITUDINAL.

(A)MACH = 7.32

DATA SET SYMBOL	CONFIGURATION DESCRIPTION		RUDDER	AILRON	ELEVON	PLUMES
(REG010)	AMES 3.5-175 IA15 OT+L+P1+A1		.000	.000	.000	.000
(REG002)	AMES 3.5-175 IA15 OT+L+P1+A1+F		.000	.000	.000	.000
(REG022)	AMES 3.5-175 IA15 OT+L+P1+A1	PLUMES ON	.000	.000	.000	1.000
(REG024)	AMES 3.5-175 IA15 OT+L+P1+A1+F	PLUMES ON	.000	.000	.000	1.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

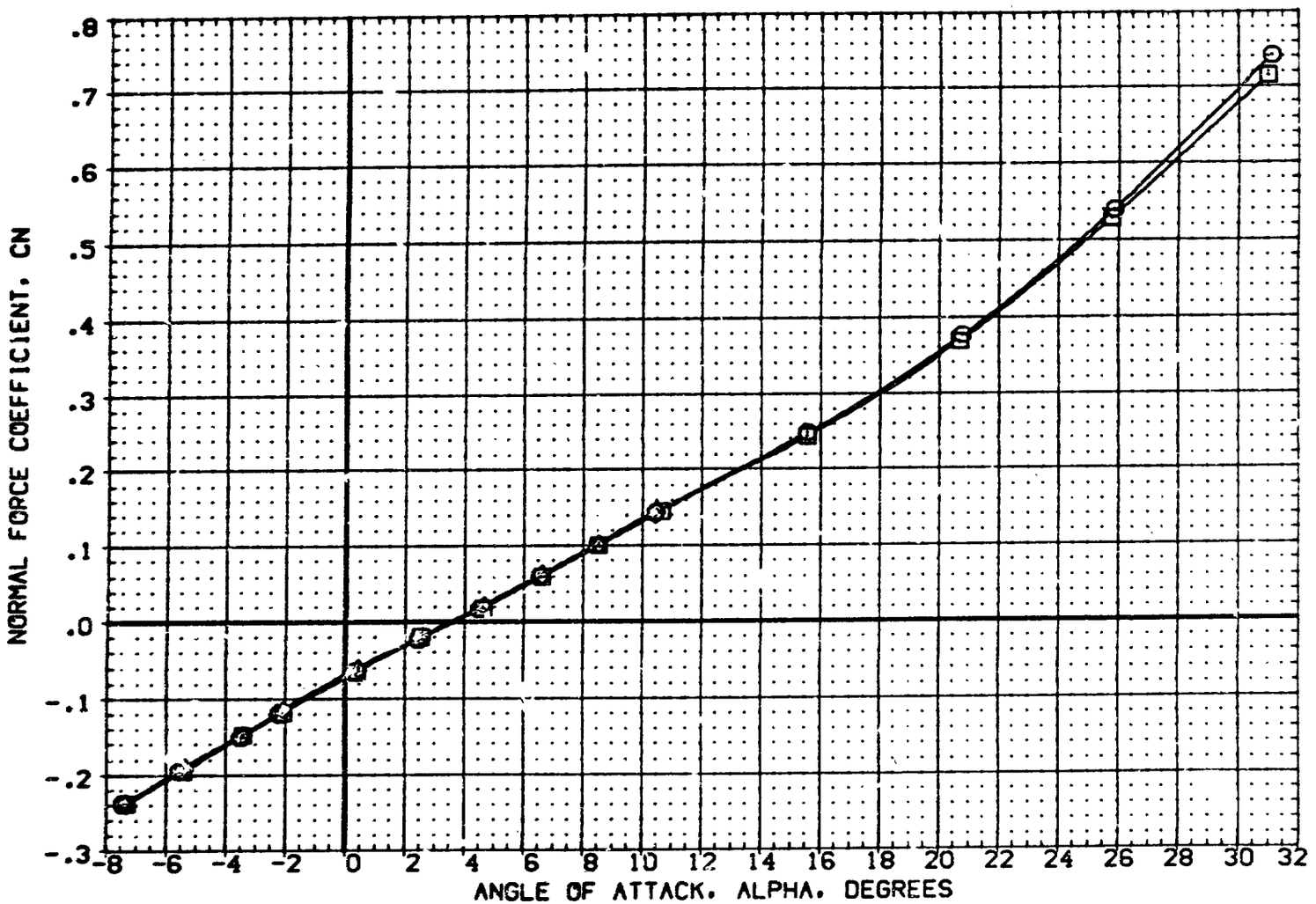


FIG. 8 POWER ON AND OFF, WITH AND WITHOUT FAIRING, LONGITUDINAL.

(A)MACH = 7.32

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION		RUDDER	AILRON	ELEVON	PLUMES
(REG010)	○	AMES 3.5-175 IAIS OT+L+PI+AI		.000	.000	.000	.000
(REG002)	□	AMES 3.5-175 IAIS OT+L+PI+AI+F		.000	.000	.000	.000
(REG022)	◇	AMES 3.5-175 IAIS OT+L+PI+AI	PLUMES ON	.000	.000	.000	1.000
(REG024)	△	AMES 3.5-175 IAIS OT+L+PI+AI+F	PLUMES ON	.000	.000	.000	1.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.7807	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

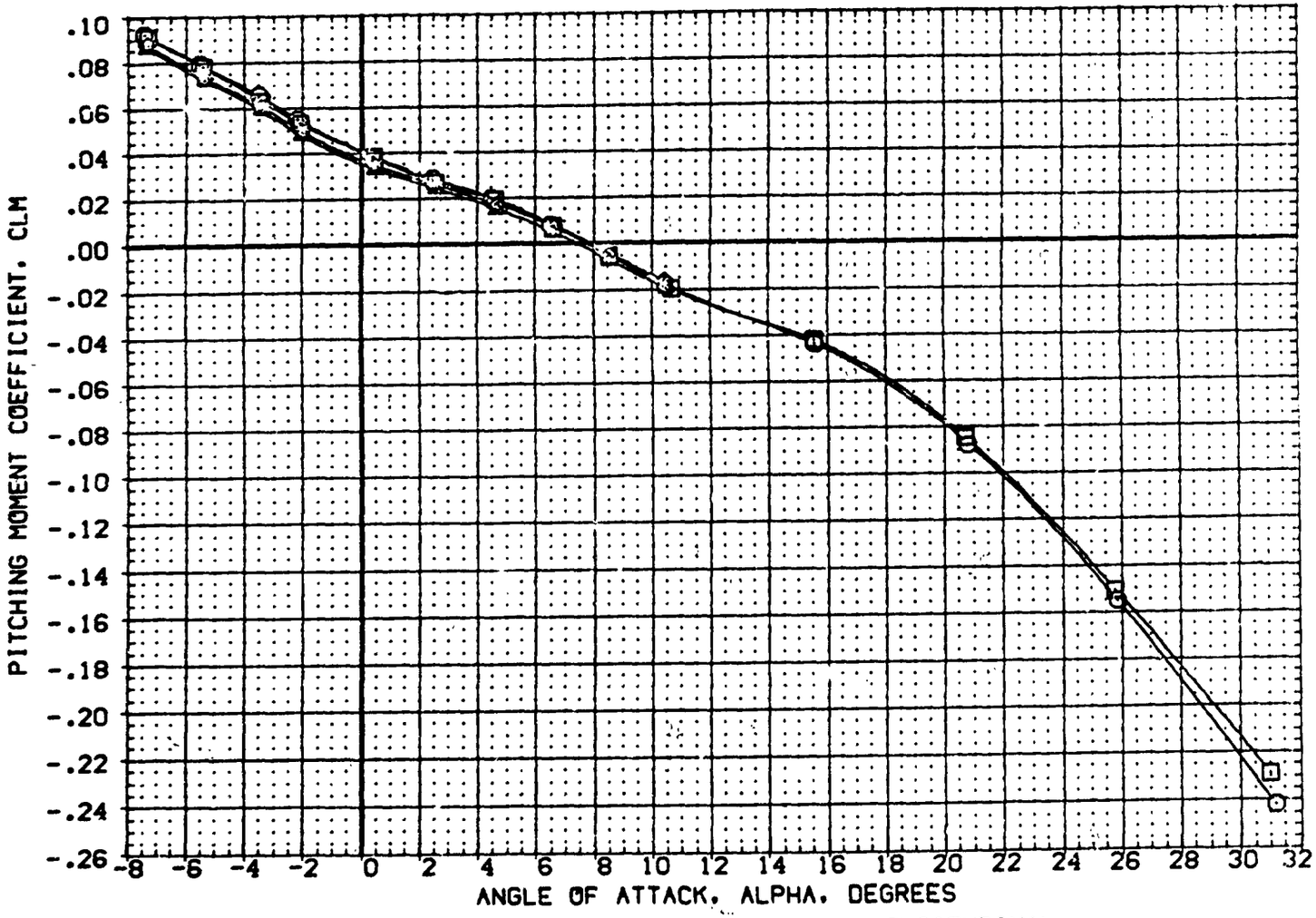


FIG. 8 POWER ON AND OFF, WITH AND WITHOUT FAIRING, LONGITUDINAL.

(A)MACH = 7.32

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION		RUDDER	AILRON	ELEVON	PLUMES
(REG010)	○	AMES 3.5-175 IAIS OT+L+P1+A1		.000	.000	.000	.000
(REG002)	□	AMES 3.5-175 IAIS OT+L+P1+A1+F		.000	.000	.000	.000
(REG022)	⊗	AMES 3.5-175 IAIS OT+L+P1+A1	PLUMES ON	.000	.000	.000	1.000
(REG024)	△	AMES 3.5-175 IAIS OT+L+P1+A1+F	PLUMES ON	.000	.000	.000	1.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

FIG. 8 POWER ON AND OFF, WITH AND WITHOUT FAIRING, LONGITUDINAL.

(A)MACH = 7.32

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	RUDDER	AILRON	ELEVON	FLAPES
(REG004)	○	AMES 3.5-175 (AIS OT+L+P1+A1+F	.000	.000	-40.000	.000
(REG005)	□	AMES 3.5-175 (AIS OT+L+P1+A1+F	.000	.000	15.000	.000
(REG006)	◇	AMES 3.5-175 (AIS OT+L+P1+A1	.000	.000	15.000	.000
(REG007)	△	AMES 3.5-175 (AIS OT+L+P1+A1	.000	.000	-40.000	.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

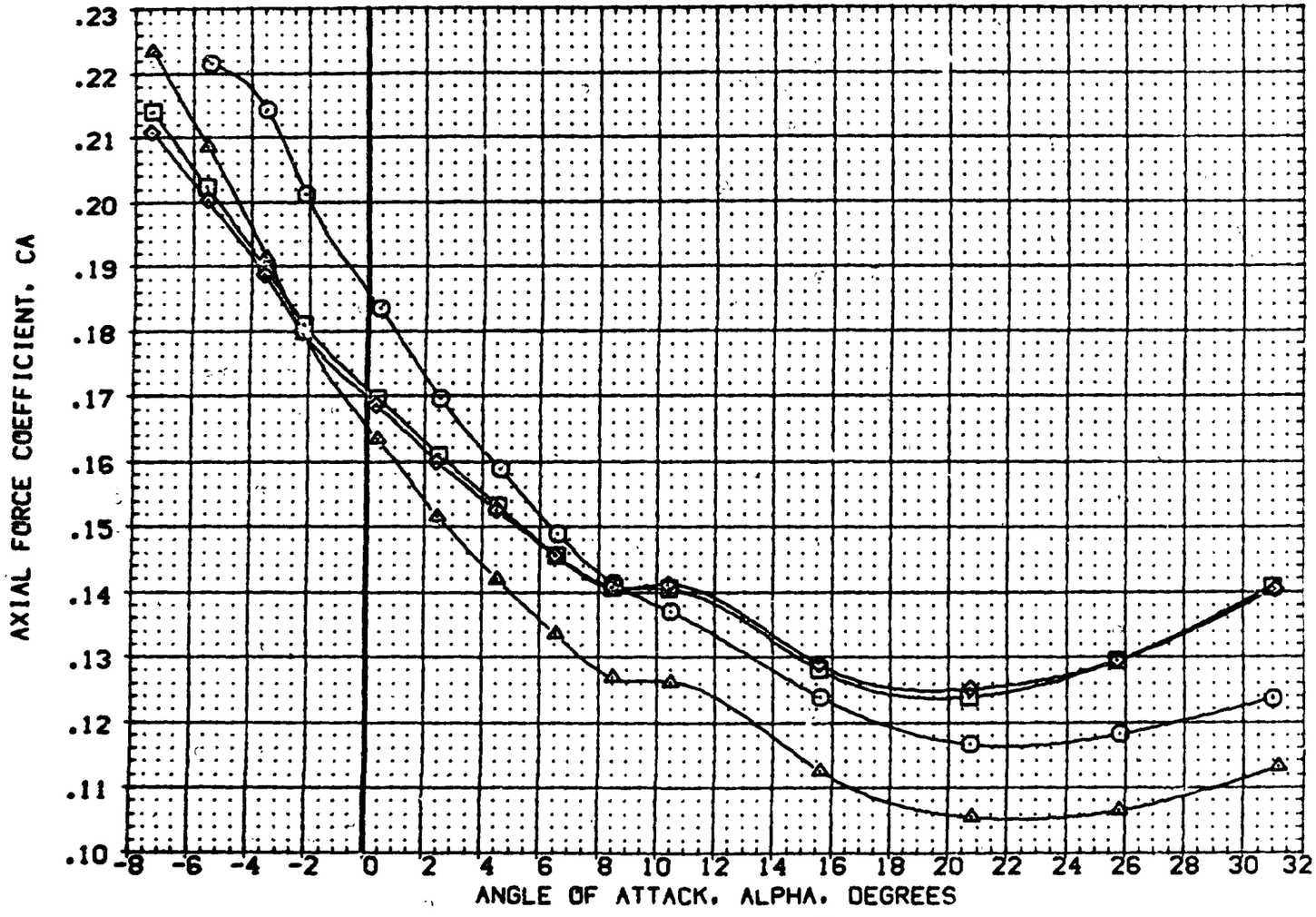


FIG. 9 WITH AND WITHOUT FAIRING, DE = 15 AND -40 DEGS., LONGITUDINAL.

(A)MACH = 7.32

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	RUDDER	AILRON	ELEVON	PLUMES
(REG004)	○	AMES 3.5-175 IAIS OT+L+PI+AI+F	.000	.000	-40.000	.000
(REG005)	□	AMES 3.5-175 IAIS OT+L+PI+AI+F	.000	.000	15.000	.000
(REG006)	◇	AMES 3.5-175 IAIS OT+L+PI+AI	.000	.000	15.000	.000
(REG007)	△	AMES 3.5-175 IAIS OT+L+PI+AI	.000	.000	-40.000	.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

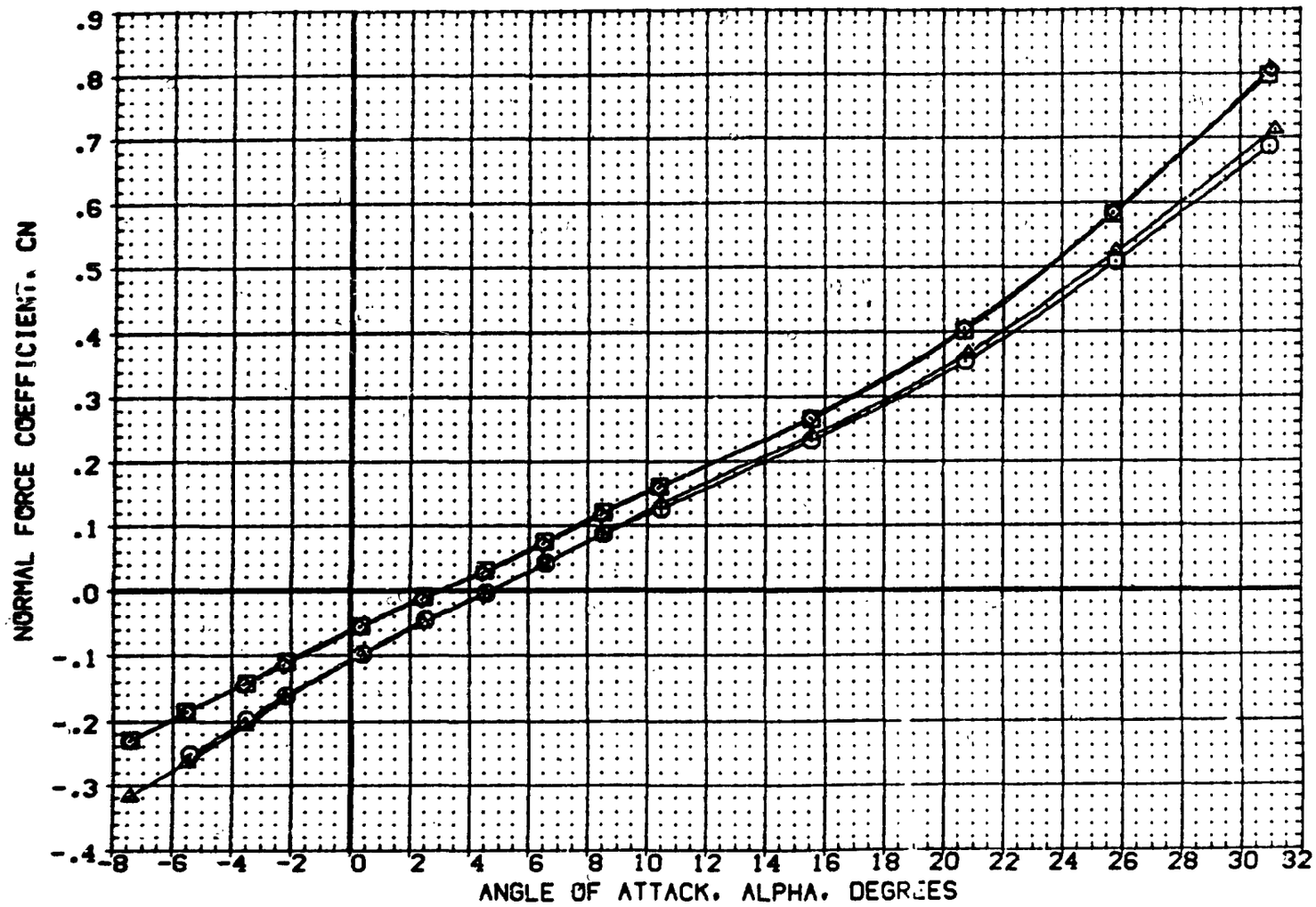


FIG. 9 WITH AND WITHOUT FAIRING, DE = 15 AND -40 DEGS., LONGITUDINAL.

(A)MACH = 7.32

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(REG004)	○	AMES 3.5-175 IA15 OT+L+PI+AI+F
(REG005)	□	AMES 3.5-175 IA15 OT+L+PI+AI+F
(REG006)	⊠	AMES 3.5-175 IA15 OT+L+PI+AI
(REG007)	△	AMES 3.5-175 IA15 OT+L+PI+AI

RUDDER	AILRON	ELEVON	PLUMES
.000	.000	-40.000	.000
.000	.000	15.000	.000
.000	.000	15.000	.000
.000	.000	-40.000	.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

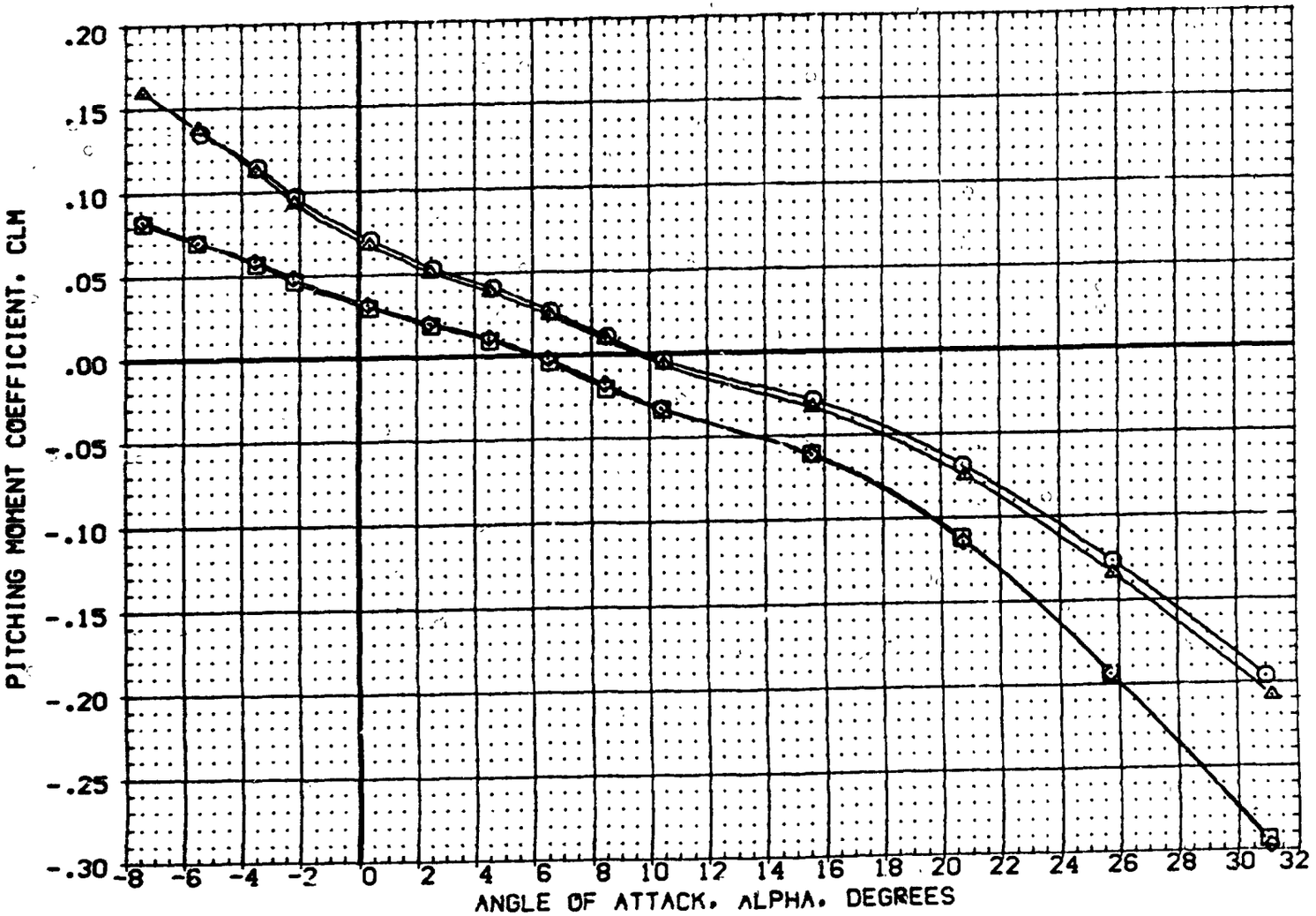


FIG. 9 WITH AND WITHOUT FAIRING, DE = 15 AND -40 DEGS., LONGITUDINAL.

(A)MACH = 7.32

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	RUDDER	AILRON	ELEVON	PLUMES
(REG004)	○	AMES 3.5-175 IAIS OT+L+PI+AI+F	.000	.000	-40.000	.000
(REG005)	□	AMES 3.5-175 IAIS OT+L+PI+AI+F	.000	.000	15.000	.000
(REG006)	⊠	AMES 3.5-175 IAIS OT+L+PI+AI	.000	.000	15.000	.000
(REG007)	△	AMES 3.5-175 IAIS OT+L+PI+AI	.000	.000	-40.000	.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

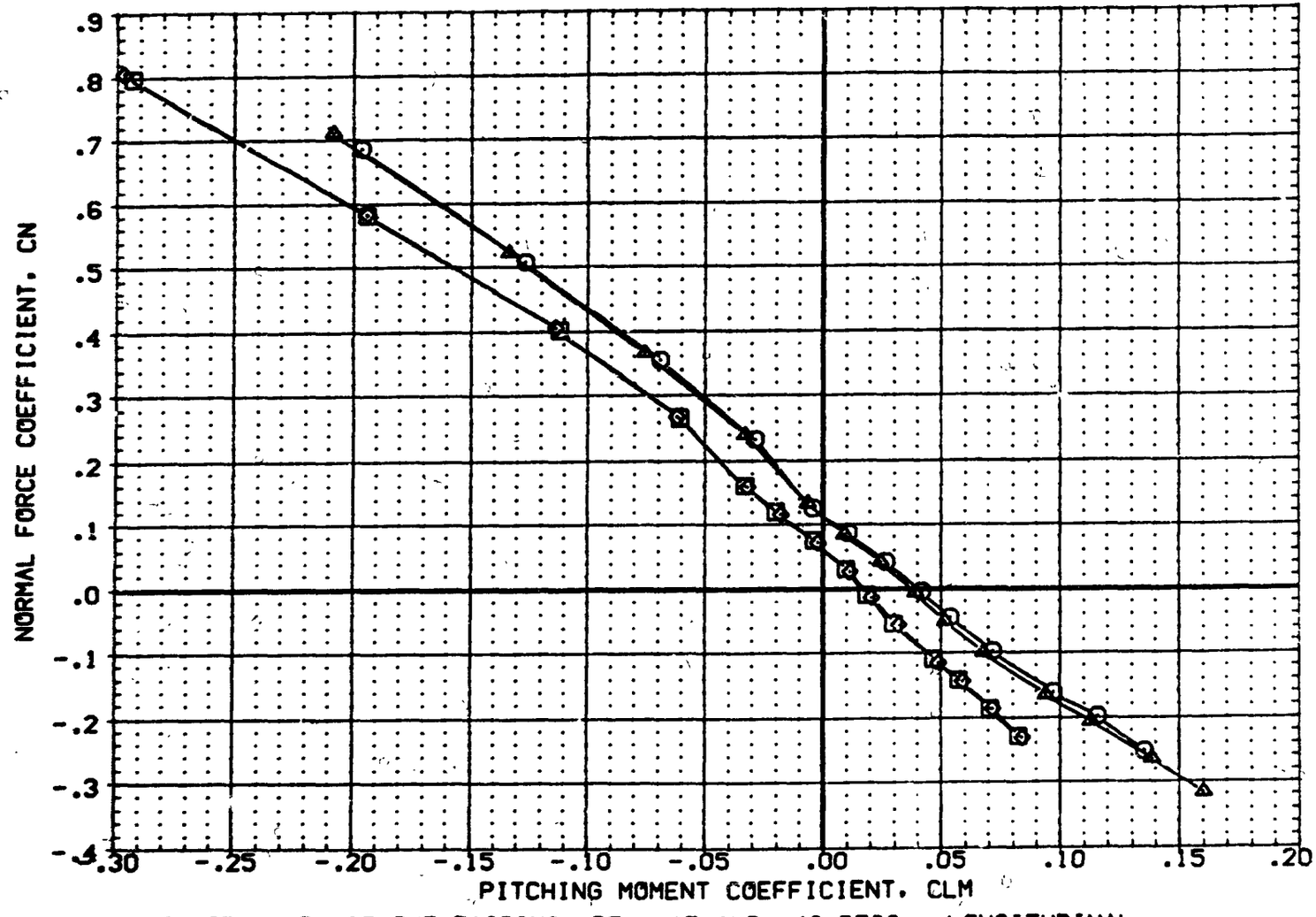


FIG. 9 WITH AND WITHOUT FAIRING, DE = 15 AND -40 DEGS., LONGITUDINAL.

(A)MACH = 7.32

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION		RUDDER	AILRON	ELEVON	PLUMES
(REG014)	○	AMES 3.5-175 IA15 OT+L+P1+A1+F		.000	.000	.000	.000
(REG016)	□	AMES 3.5-175 IA15 OT+L+P1+A1		.000	.000	.000	.000
(REG019)	⊗	AMES 3.5-175 IA15 OT+L+P1+A1+F	PLUMES ON	.000	.000	.000	1.000
(REG021)	△	AMES 3.5-175 IA15 OT+L+P1+A1	PLUMES ON	.000	.000	.000	1.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

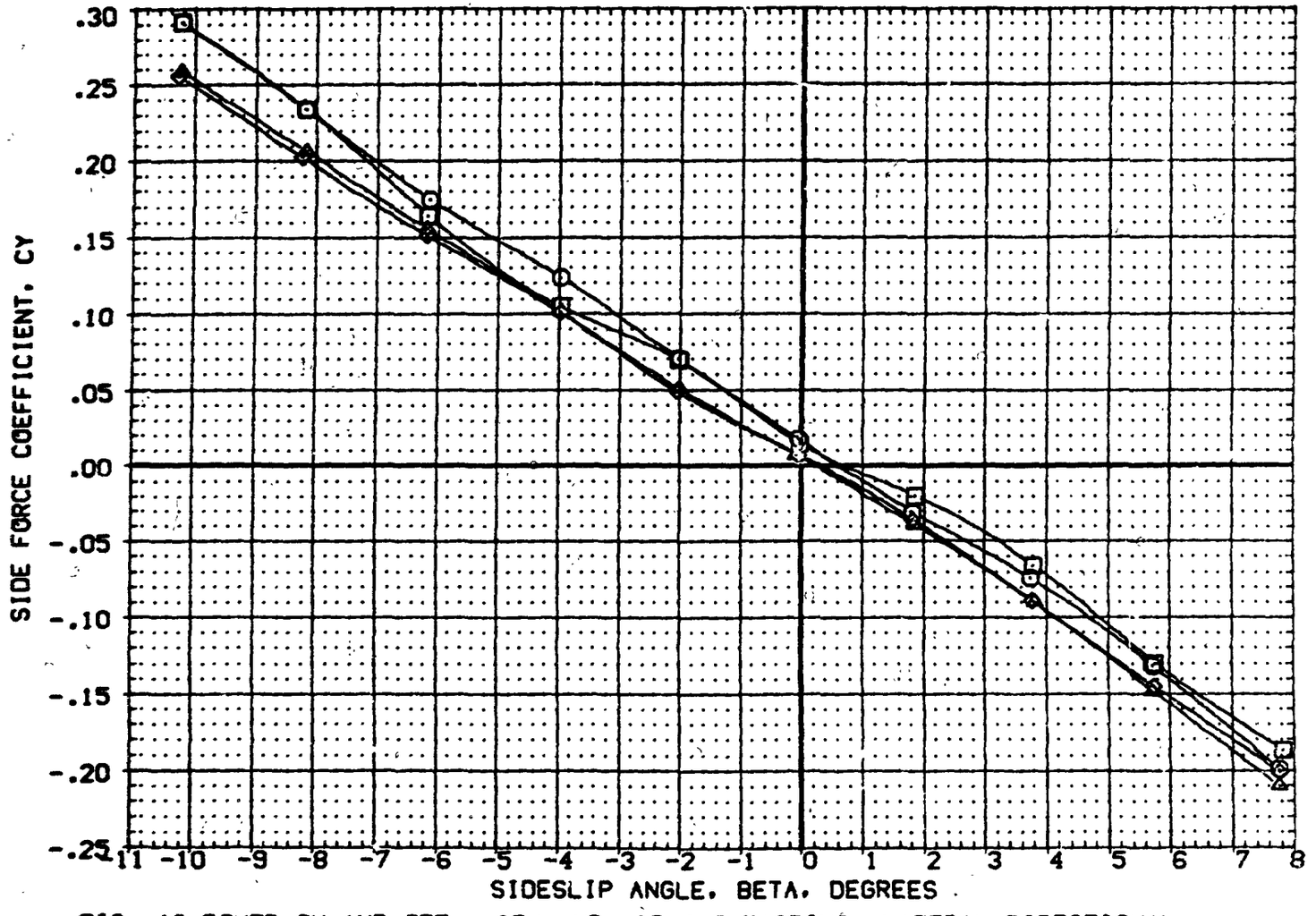


FIG. 10 POWER ON AND OFF, WITH AND WITHOUT FAIRING, LATERAL-DIRECTIONAL.

(A)MACH = 7.32

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION		RUDDER	AILRON	ELEVON	PLUMES
(REG014)	○	AMES 3.5-175 IAI5 OT+L+P1+A1+F		.000	.000	.000	.000
(REG016)	□	AMES 3.5-175 IAI5 OT+L+P1+A1		.000	.000	.000	.000
(REG019)	⊗	AMES 3.5-175 IAI5 OT+L+P1+A1+F	PLUMES ON	.000	.000	.000	1.000
(REG021)	△	AMES 3.5-175 IAI5 OT+L+P1+A1	PLUMES ON	.000	.000	.000	1.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

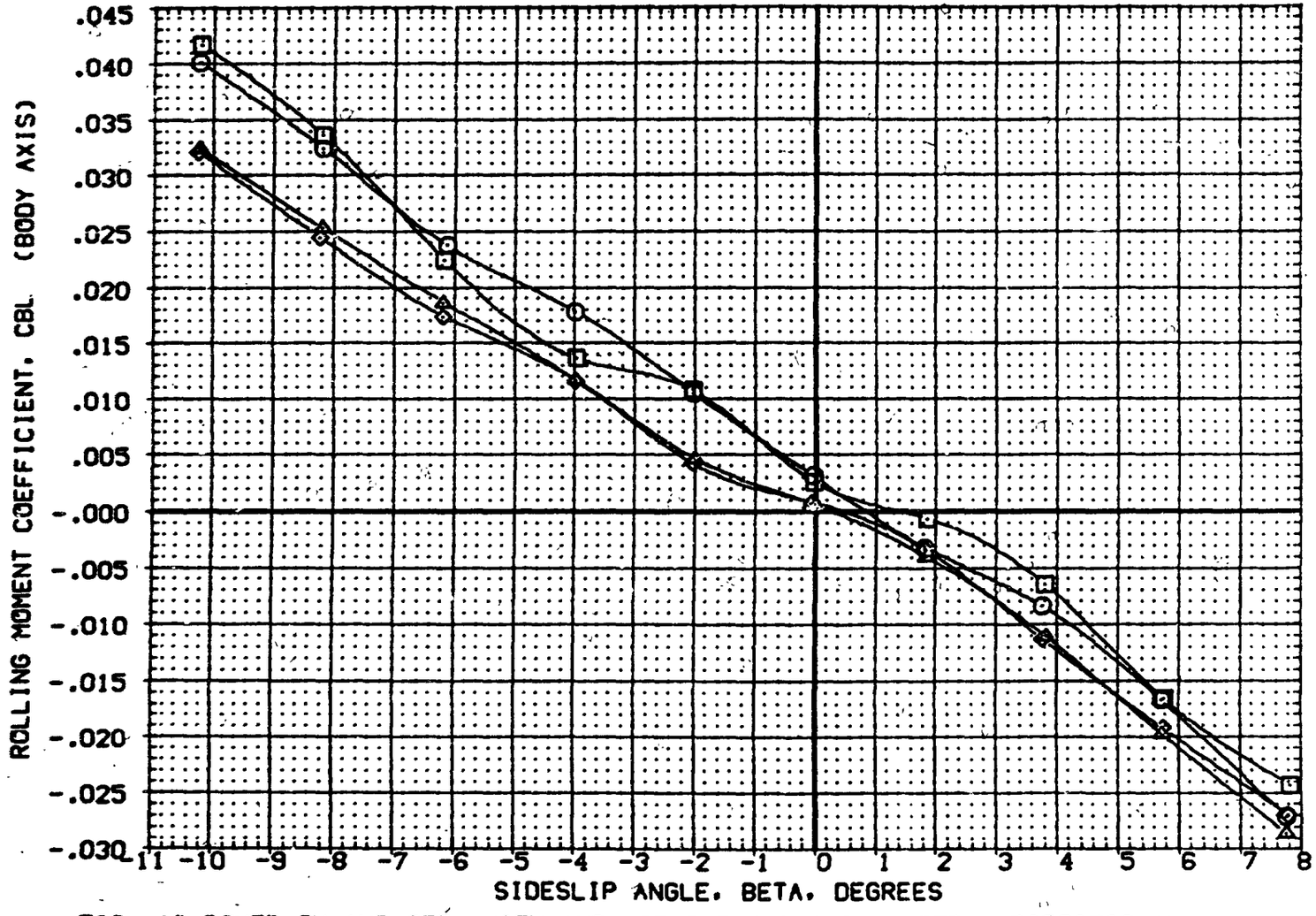


FIG. 10 POWER ON AND OFF, WITH AND WITHOUT FAIRING, LATERAL-DIRECTIONAL.

(A)MACH = 7.32

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION		RUDDER	AILRON	ELEVON	PLUMES
(REG014)	○	AMES 3.5-175 IA15 OT+L+PI+AI+F		.000	.000	.000	.000
(REG016)	□	AMES 3.5-175 IA15 OT+L+PI+AI		.000	.000	.000	.000
(REG019)	◇	AMES 3.5-175 IA15 OT+L+PI+AI+F	PLUMES ON	.000	.000	.000	1.000
(REG021)	△	AMES 3.5-175 IA15 OT+L+PI+AI	PLUMES ON	.000	.000	.000	1.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

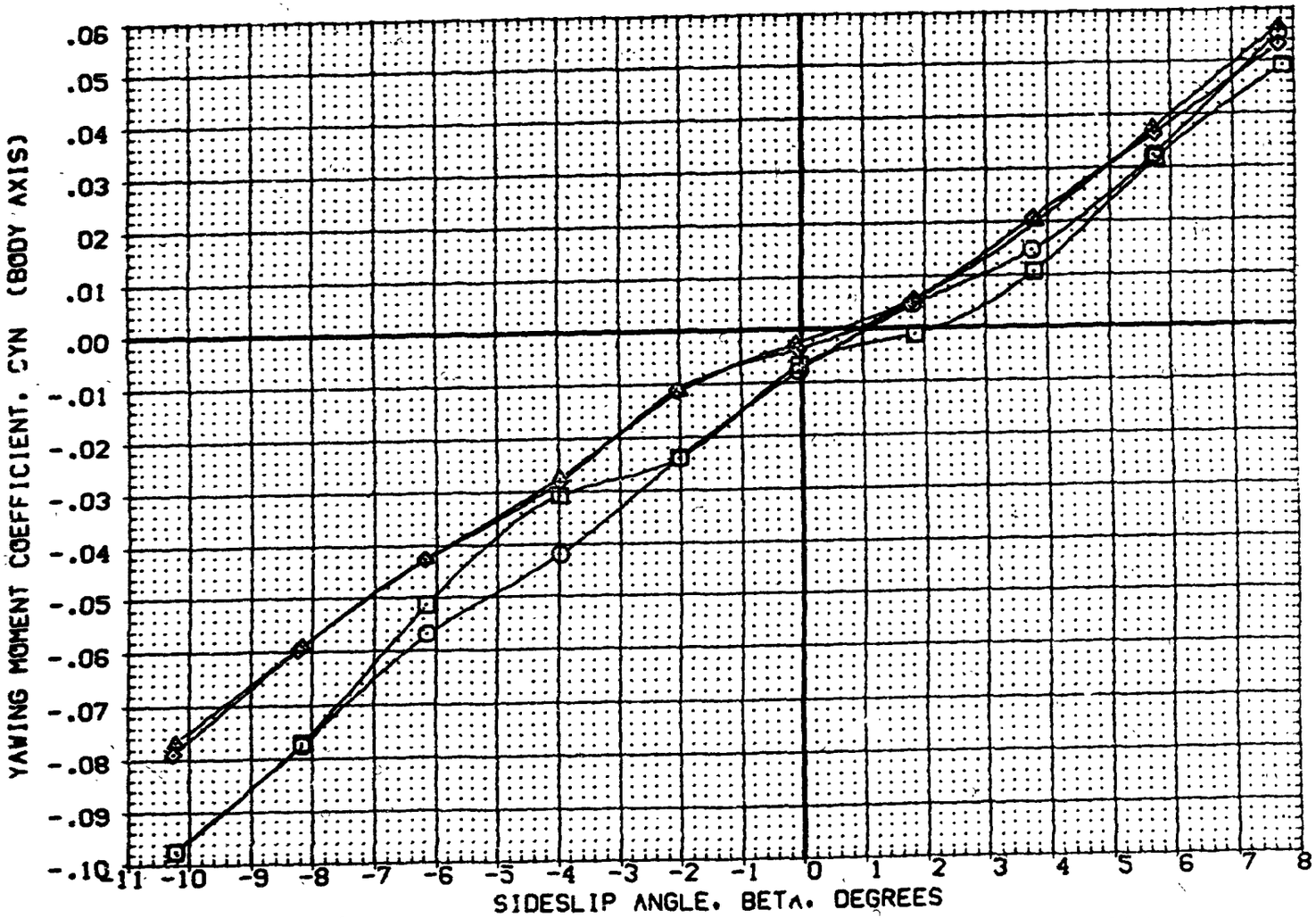


FIG. 10 POWER ON AND OFF, WITH AND WITHOUT FAIRING, LATERAL-DIRECTIONAL.

(A)MACH = 7.32

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION		RUDDER	AILRON	ELEVON	PLUMES
(REG014)	○	AMES 3.5-175 IAIS OT+L+PI+AI+F		.000	.000	.000	.000
(REG016)	□	AMES 3.5-175 IAIS OT+L+PI+AI		.000	.000	.000	.000
(REG019)	◇	AMES 3.5-175 IAIS OT+L+PI+AI+F	PLUMES ON	.000	.000	.000	1.000
(REG021)	△	AMES 3.5-175 IAIS OT+L+PI+AI	PLUMES ON	.000	.000	.000	1.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

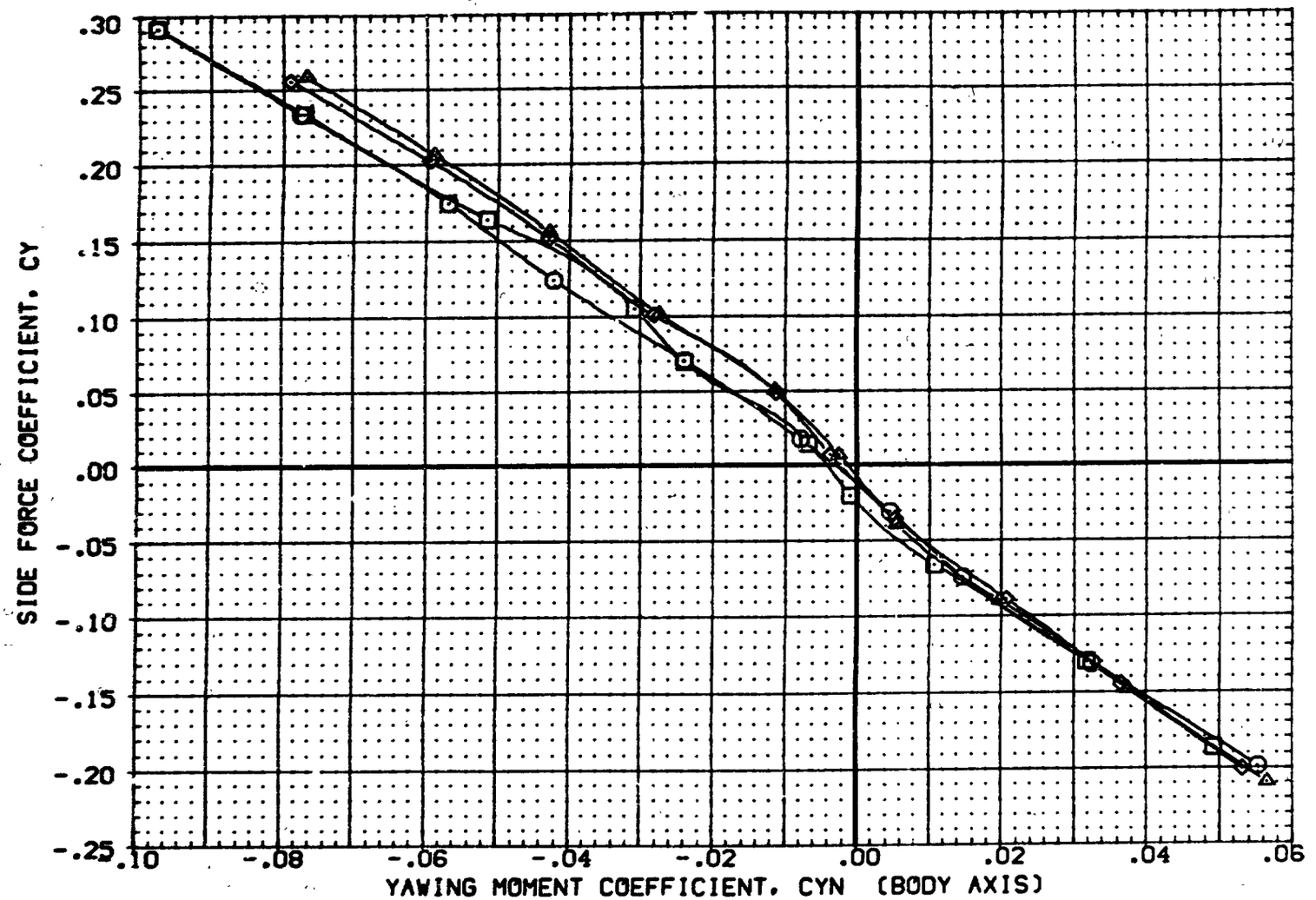


FIG. 10 POWER ON AND OFF, WITH AND WITHOUT FAIRING, LATERAL-DIRECTIONAL.

(A)MACH = 7.32

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	RUDDER	AILRON	ELEVON	PLUMES
(REG003) ○	AMES 3.5-175 IAI5 OT+L+P1+A1+F	-20.000	.000	.000	.000
(REG023) □	AMES 3.5-175 IAI5 OT+L+P1+A1+F PLUMES ON	-20.000	.000	.000	1.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

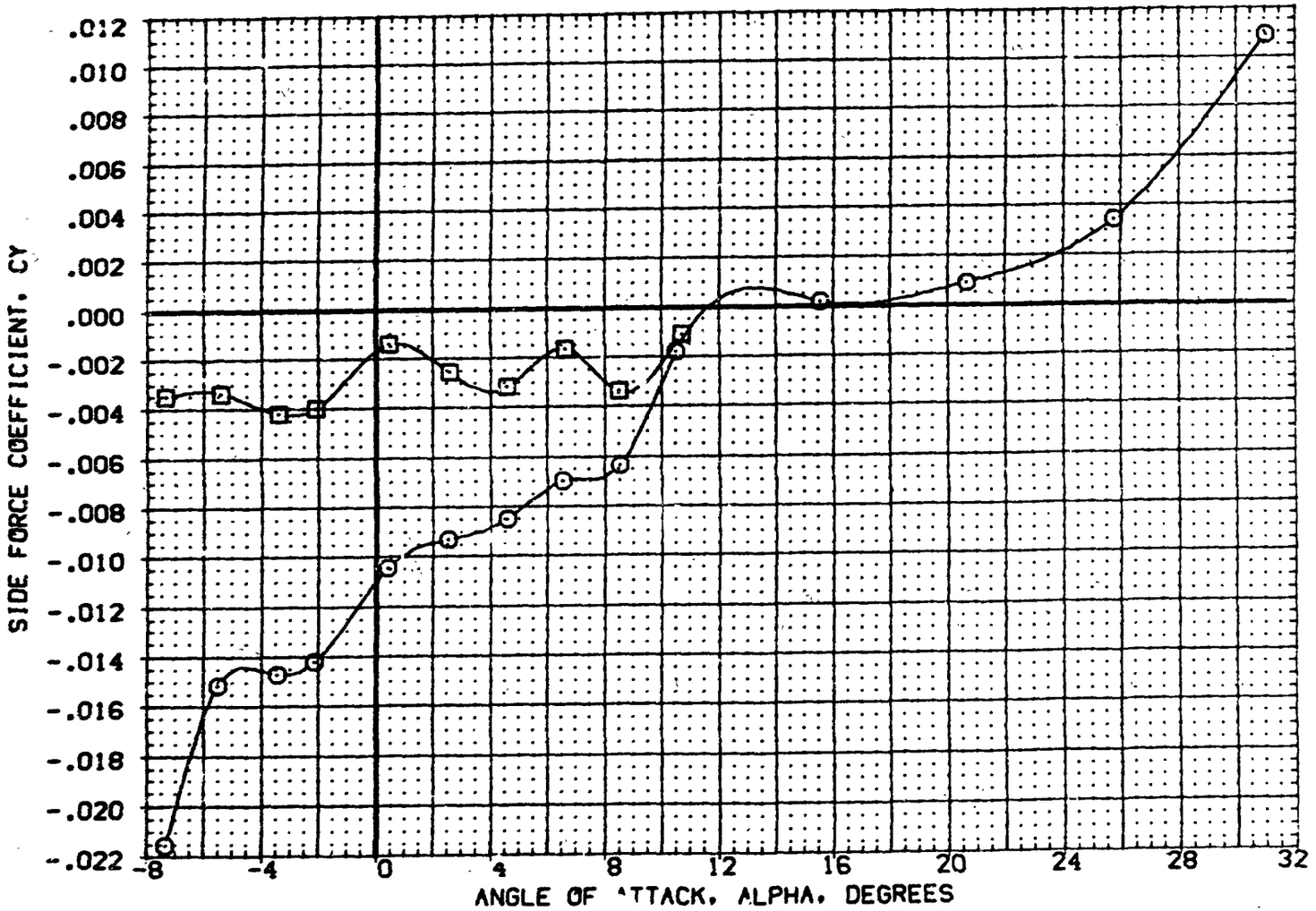


FIG. 11 RUDDER DEFLECTION, POWER ON AND OFF, LATERAL-DIRECTIONAL (PITCH).

(A)MACH = 7.32

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	RUDDER	AILRON	ELEVON	PLUMES
(REG003)	AMES 3.5-175 IAIS OT+L+P1+A1+F	-20.000	.000	.000	.000
(REG023)	AMES 3.5-175 IAIS OT+L+P1+A1+F PLUMES ON	-20.000	.000	.000	1.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

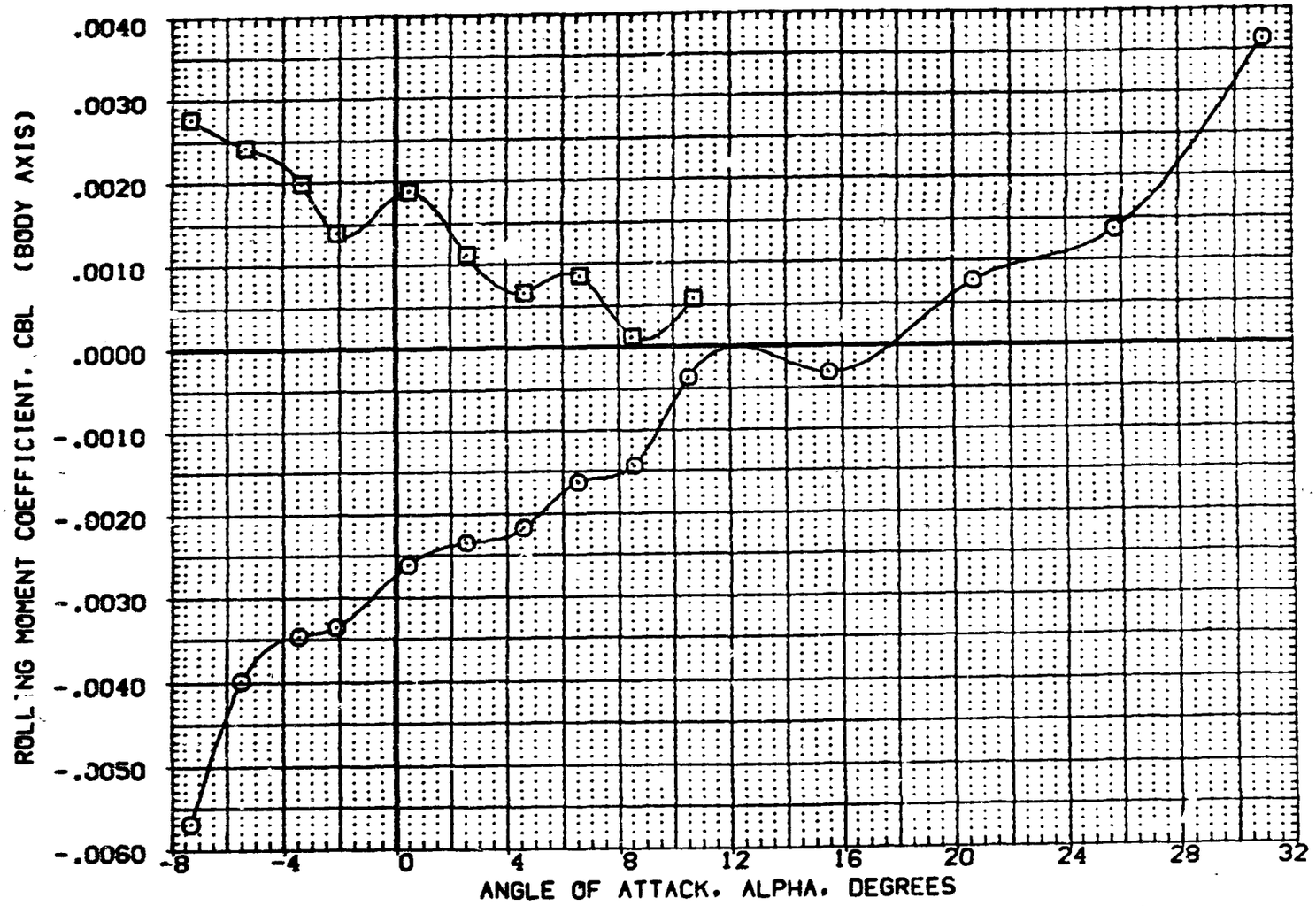


FIG. 11 RUDDER DEFLECTION, POWER ON AND OFF, LATERAL-DIRECTIONAL (PITCH).

(A)MACH = 7.32

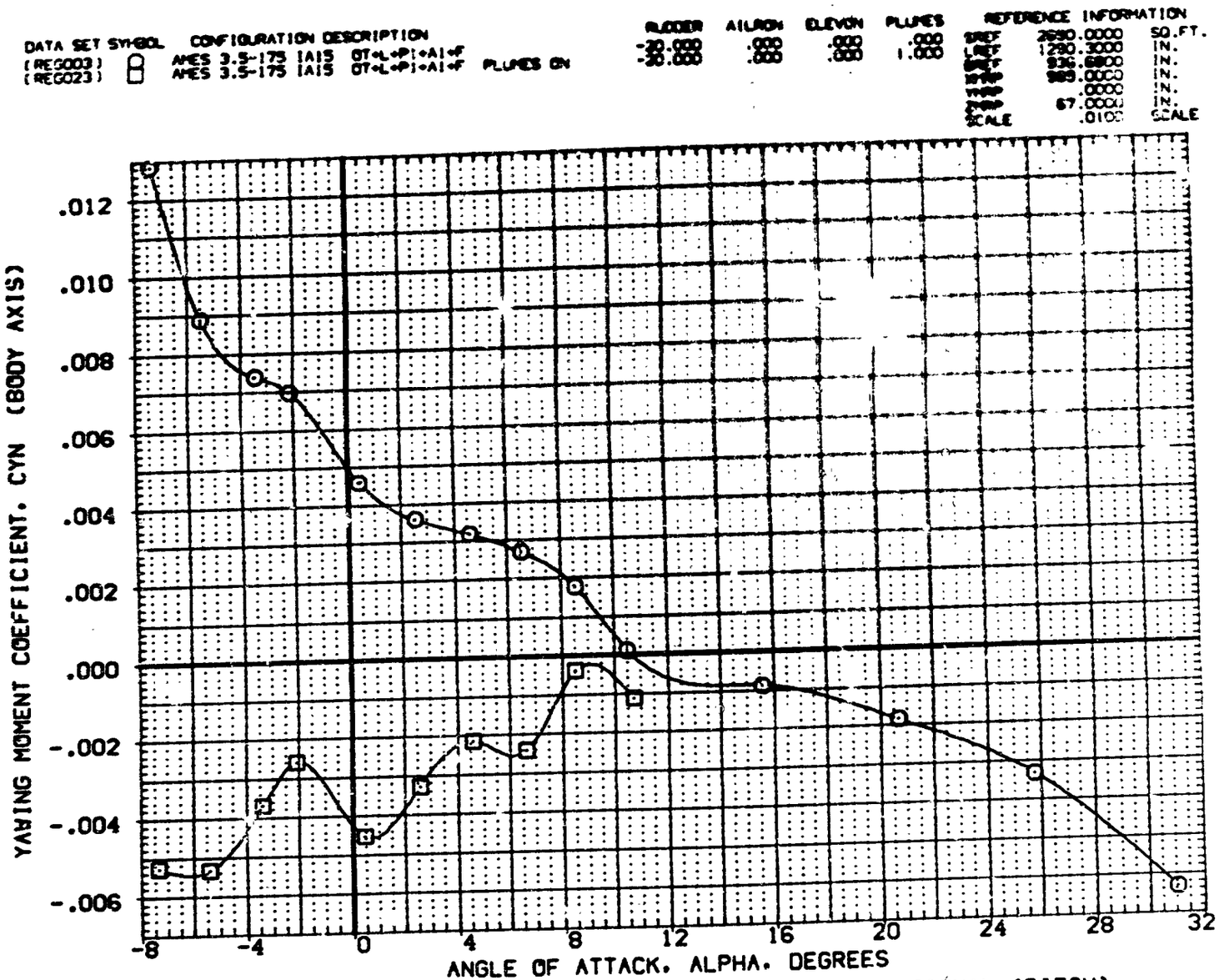


FIG. 11 RUDDER DEFLECTION, POWER ON AND OFF, LATERAL-DIRECTIONAL (PITCH).

(A)MACH = 7.32

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	RUDDER	AILRON	ELEVON	PLUMES
(REG015)	○	AMES 3.5-175 IA15 OT+L+P1+A1+F	-20.000	.000	.000	.000
(REG020)	□	AMES 3.5-175 IA15 OT+L+P1+A1+F PLUMES ON	-20.000	.000	.000	1.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

FIG. 12 RUDDER DEFLECTION, POWER ON AND OFF, LATERAL-DIRECTIONAL (YAW).

(A)MACH = 7.32

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	RUDDER	AILRON	ELEVON	PLUMES
(REG015) ☐	AMES 3.5-17S IA15 OT+L+P1+A1+F	-20.000	.000	.000	.000
(REG020) ☐	AMES 3.5-17S IA15 OT+L+F1+A1+F PLUMES ON	-20.000	.000	.000	1.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	389.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

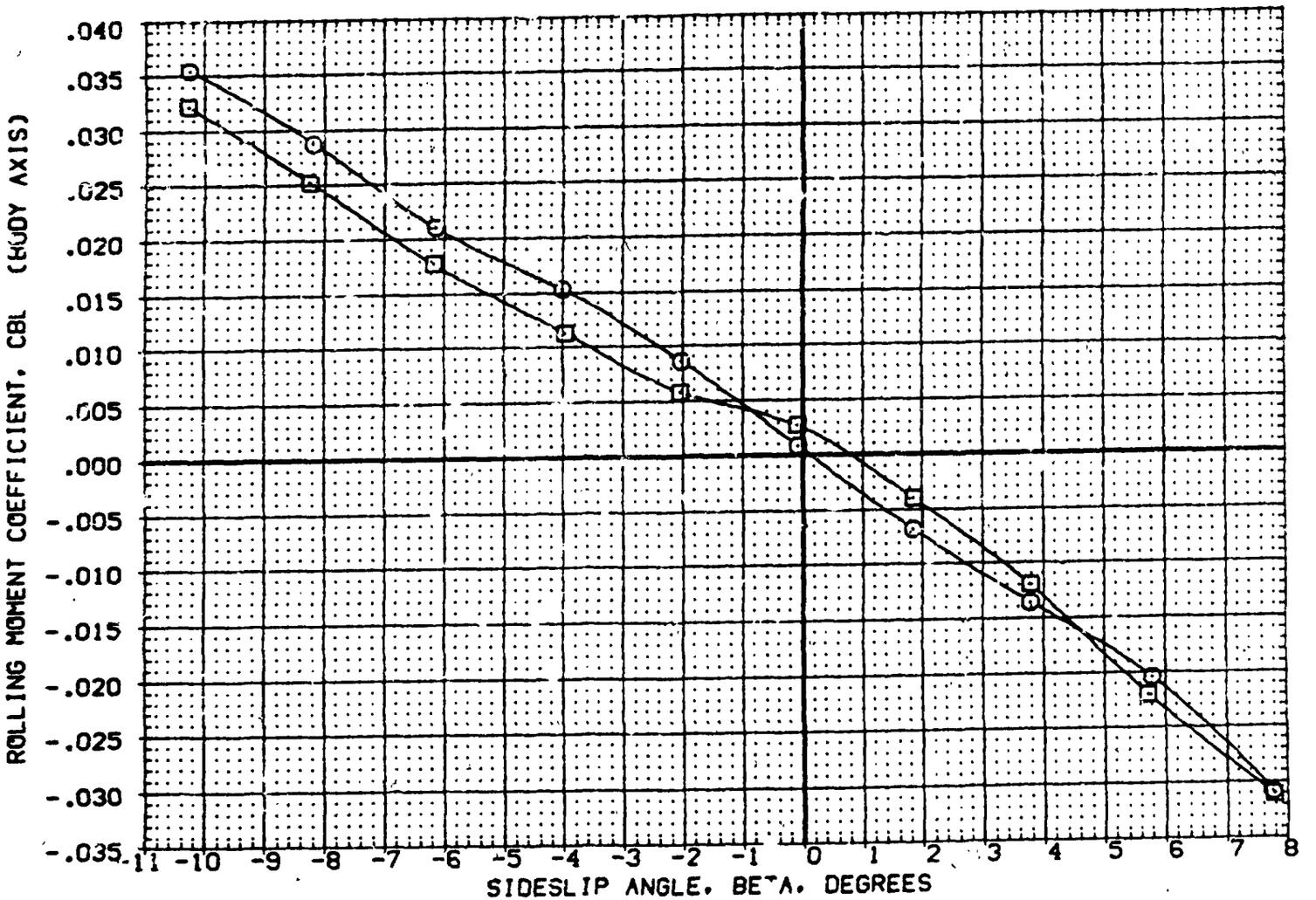


FIG. 12 RUDDER DEFLECTION, POWER ON AND OFF, LATERAL-DIRECTIONAL (YAW).

(A)MACH = 7.32

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	RUDDER	AILRON	ELEVON	PLUMES
(RE3015)		AMES 3.5-175 IA15 OT+L+P1+A1+F	-20.000	.000	.000	.000
(RE3020)		AMES 3.5-175 IA15 OT+L+P1+A1+F PLUMES ON	-20.000	.000	.000	1.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

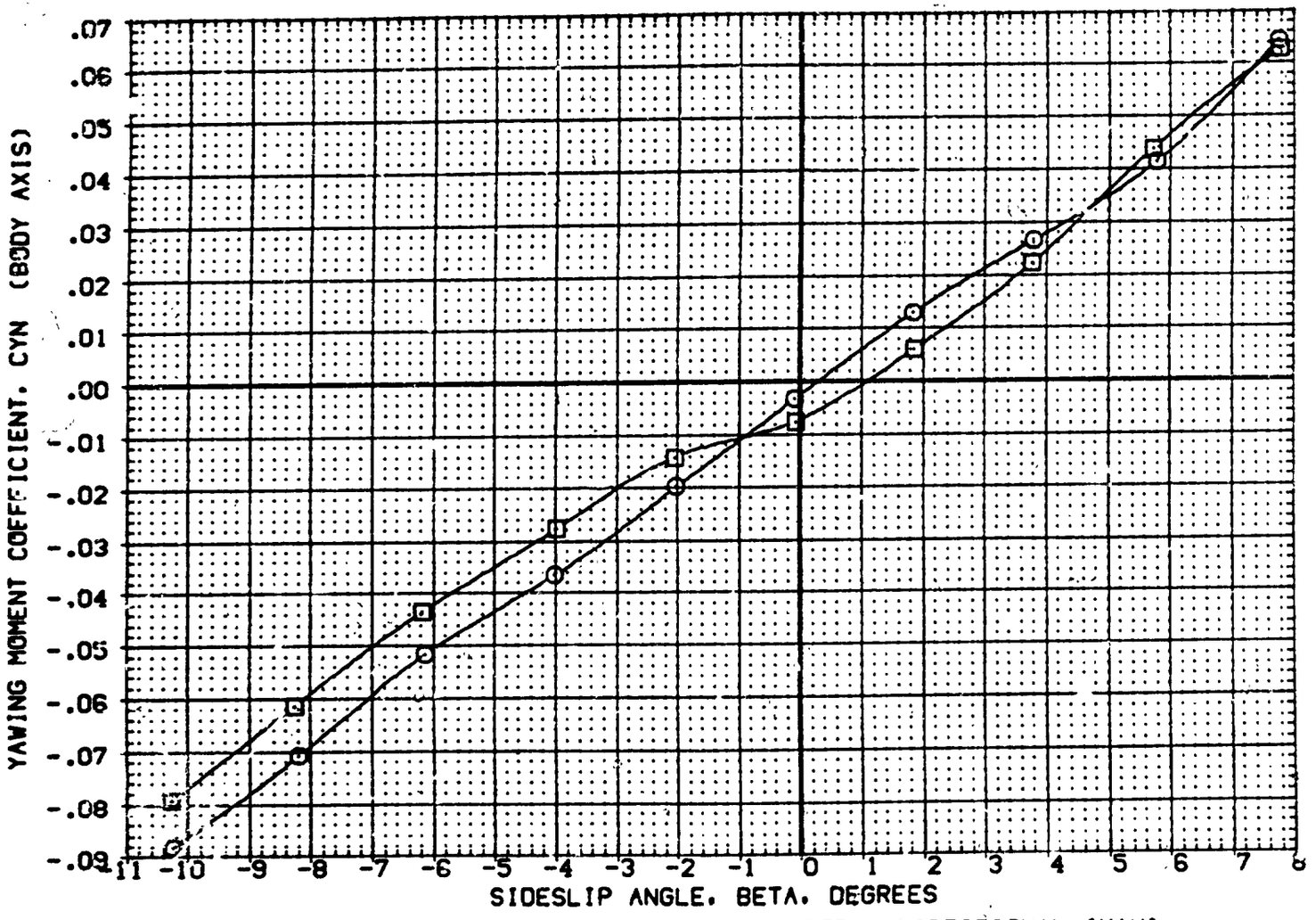


FIG. 12 RUDDER DEFLECTION, POWER ON AND OFF, LATERAL-DIRECTIONAL (YAW).

(A)MACH = 7.32

DATA SET SYMBOL		CONFIGURATION DESCRIPTION	RUDDER	AILRON	ELEVON	PLUMES
(REG015)	8	AMES 3.5-175 IA15 OT+L+PI+AI+F	-20.000	.000	.000	.000
(REG020)	8	AMES 3.5-175 IA15 OT+L+PI+AI+F PLUMES ON	-20.000	.000	.000	1.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

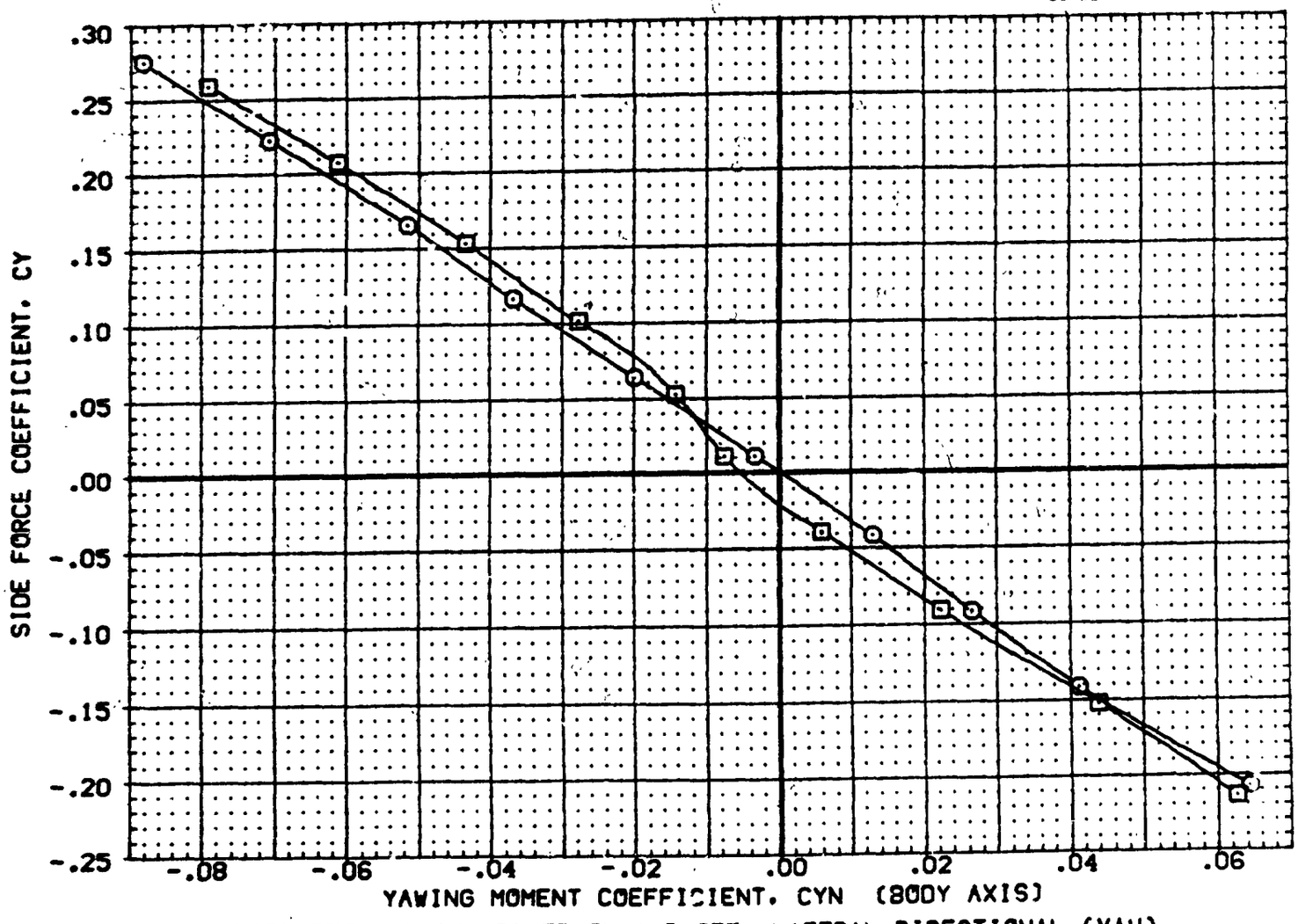


FIG. 12 RUDDER DEFLECTION, POWER ON AND OFF, LATERAL-DIRECTIONAL (YAW).

(A)MACH = 7.32

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(REGO;2) ○	AMES 3.5-175 (A) OT+L+P1+A1+F
(REFO13) □	AMES 3.5-175 (A)> OT+L+P1+A1+F

RUDDER	AILRON	ELEVON	PLUMES
-20.000	.000	.000	.000
.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

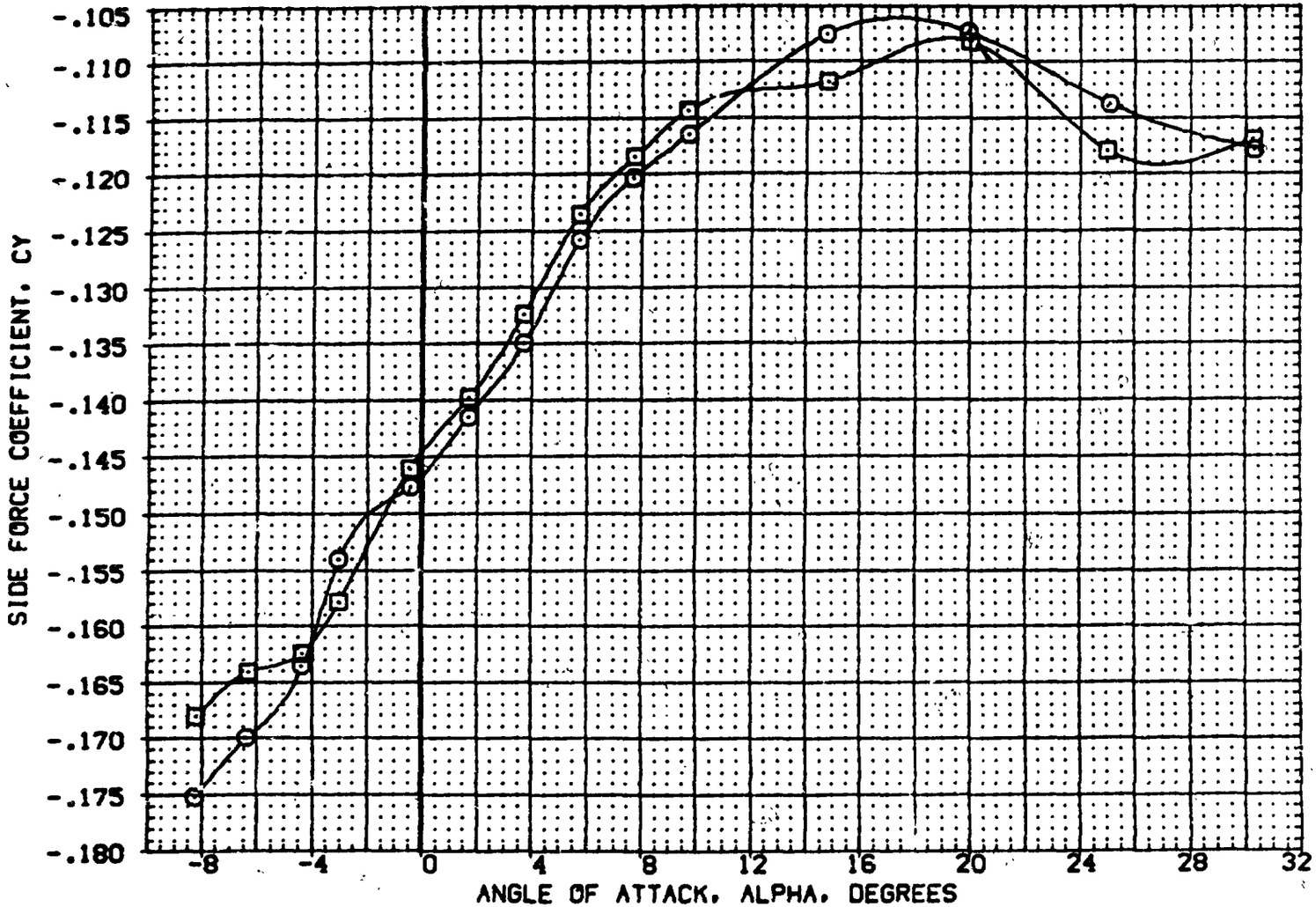


FIG. 13 RUDDER DEFLECTION WITH BETA = 5 DEG., LATERAL-DIRECTIONAL (PITCH).

(A)MACH = 7.32

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	RUDDER	AILRON	ELEVON	PLUMES
(REGO12)	AMES 3.5-17S IAIS OT+L+P1+A1+F	-20.000	.000	.000	.000
(REGO13)	AMES 3.5-17S IAIS OT+L+P1+A1+F	.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BR	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

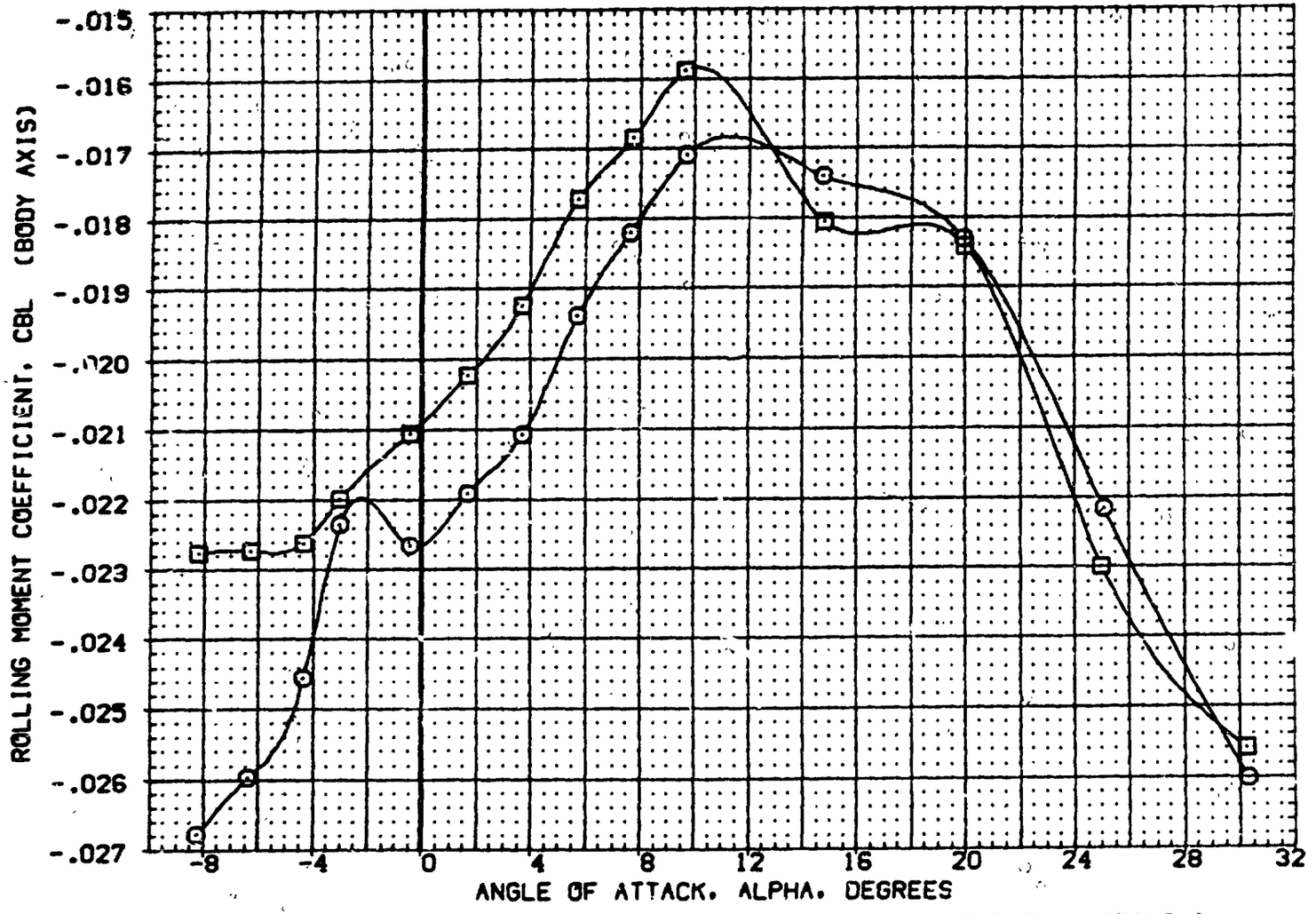


FIG. 13 RUDDER DEFLECTION WITH BETA = 5 DEG., LATERAL-DIRECTIONAL (PITCH).

(A)MACH = 7.32

[redacted]

DATA SET SYMBOL		CONFIGURATION DESCRIPTION
(REG012)	6	AMES 3.5-175 IAIS OT+L+P1+A1+F
(REG013)	6	AMES 3.5-175 IAIS OT+L+P1+A1+F

RUDDER	AILRON	ELEVON	PLUMES
-20.000	.000	.000	.000
.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

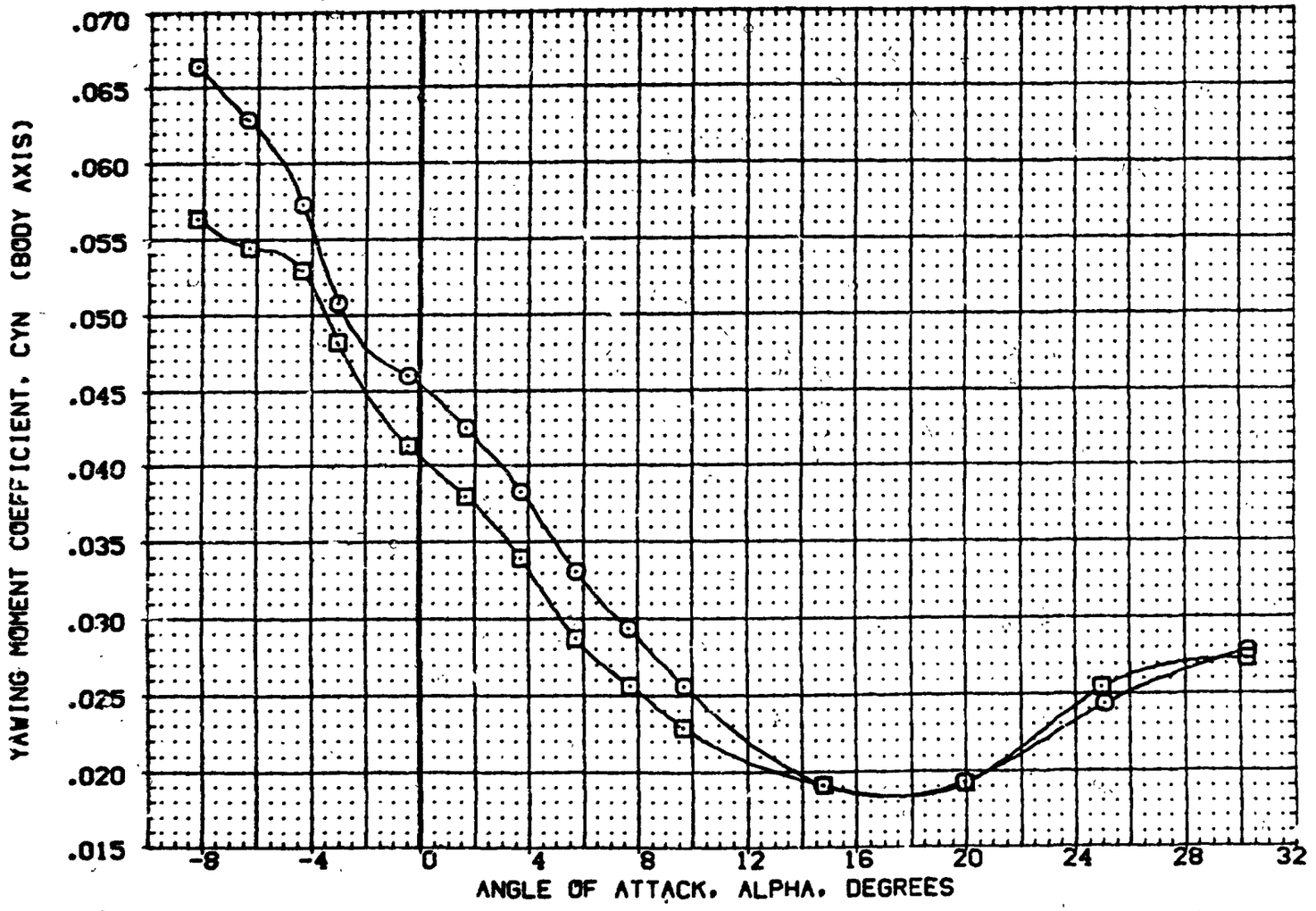


FIG. 13 RUDDER DEFLECTION WITH BETA = 5 DEG., LATERAL-DIRECTIONAL (PITCH).

(A)MACH = 7.32

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(REG016)	⊟	AMES 3.5-175 IA15 OT+L+P1+A1
(REG017)	⊟	AMES 3.5-175 IA15 OT+L+P1+A1

ALPHA	AILRON	ELEVON	PLUMES
.000	.000	.000	.000
30.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

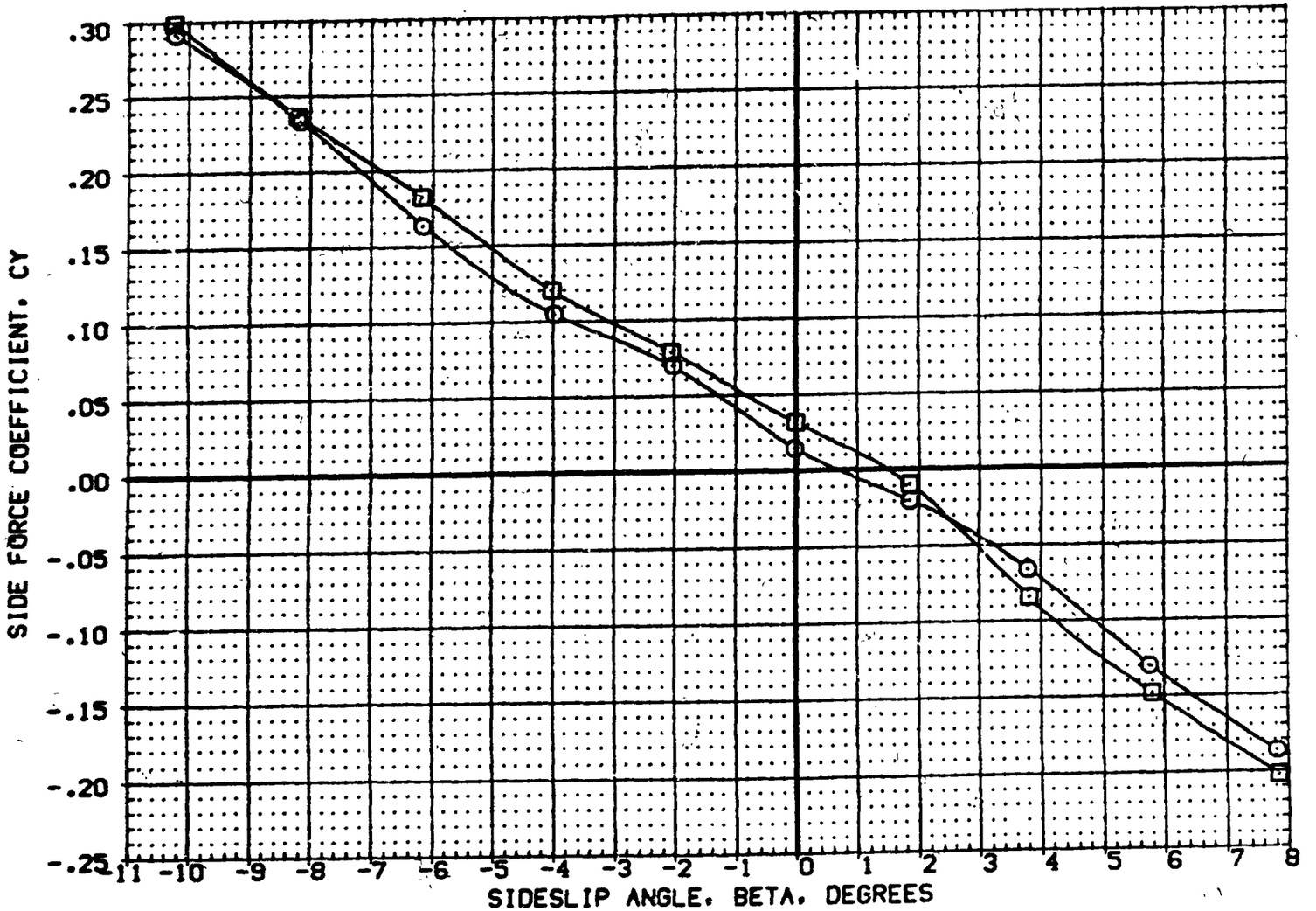


FIG. 14 YAW EFFECTS WITH ALPHA = 0 AND 30 DEG., WITHOUT FAIRING, LAT.-DIR.

(A)MACH = 7.32

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(REGO16)	8	AMES 3.5-175 IA15 OT+L+P1+A1
(REGO17)	□	AMES 3.5-175 IA15 OT+L+P1+A1

ALPHA	AILRON	ELEVON	PLUMES
.000	.000	.000	.000
30.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

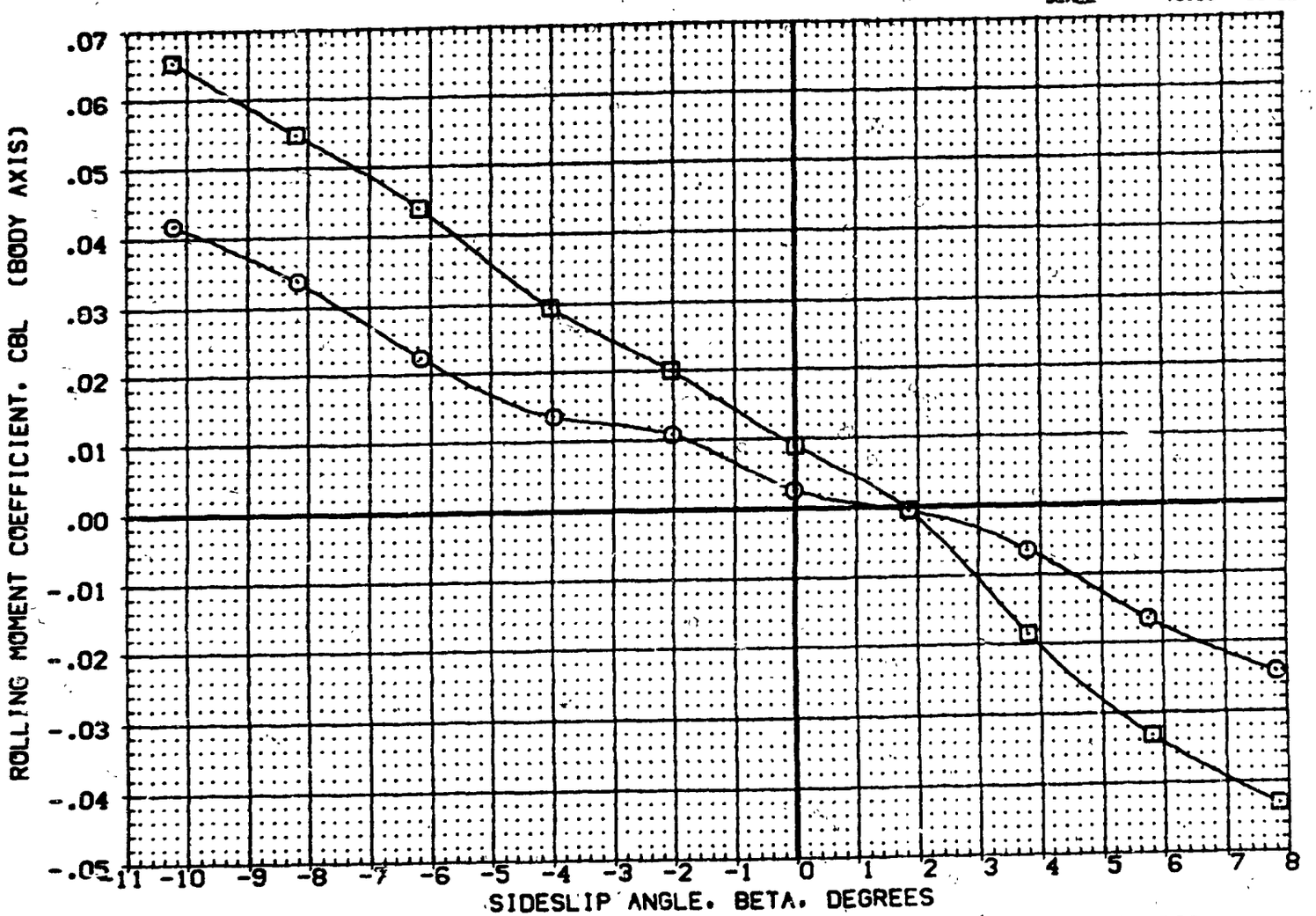


FIG. 14 YAW EFFECTS WITH ALPHA = 0 AND 30 DEG., WITHOUT FAIRING, LAT.-DIR.

(A)MACH = 7.32

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ALPHA	AILRON	ELEVON	PLUMES
(REG016)		AMES 3.5-175 IAIS OT+L+P1+A1	.000	.000	.000	.000
(REG017)		AMES 3.5-175 IAIS OT+L+P1+A1	30.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

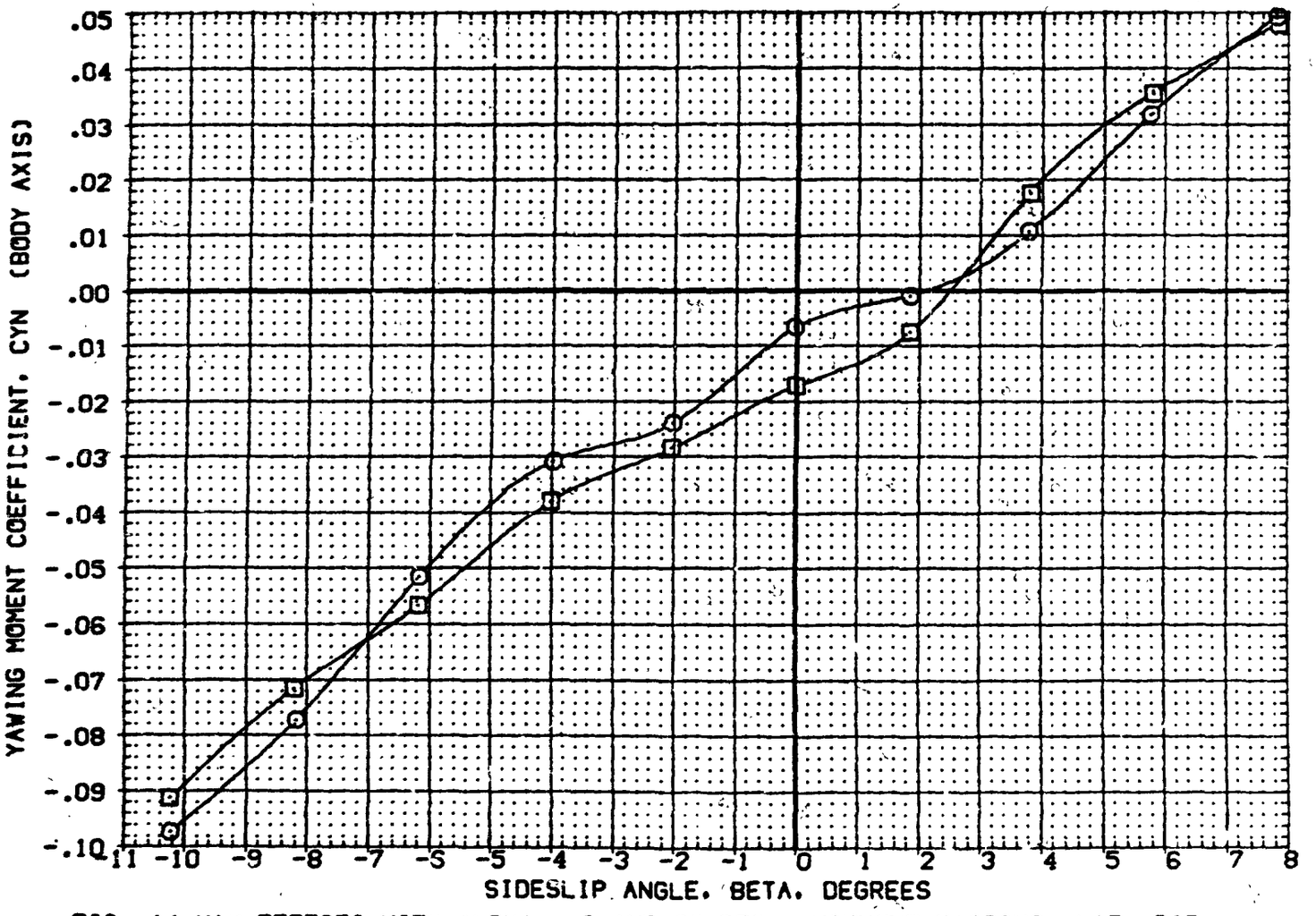


FIG. 14 YAW EFFECTS WITH ALPHA = 0 AND 30 DEG., WITHOUT FAIRING, LAT.-DIR.

(A)MACH = 7.32

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ALPHA	AILRON	ELEVON	PLUMES
(REG016)	8	AMES 3.5-175 (A15 OT+L+P1+A)	.000	.000	.000	.000
(REG017)	8	AMES 3.5-175 (A15 OT+L+P1+A)	30.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

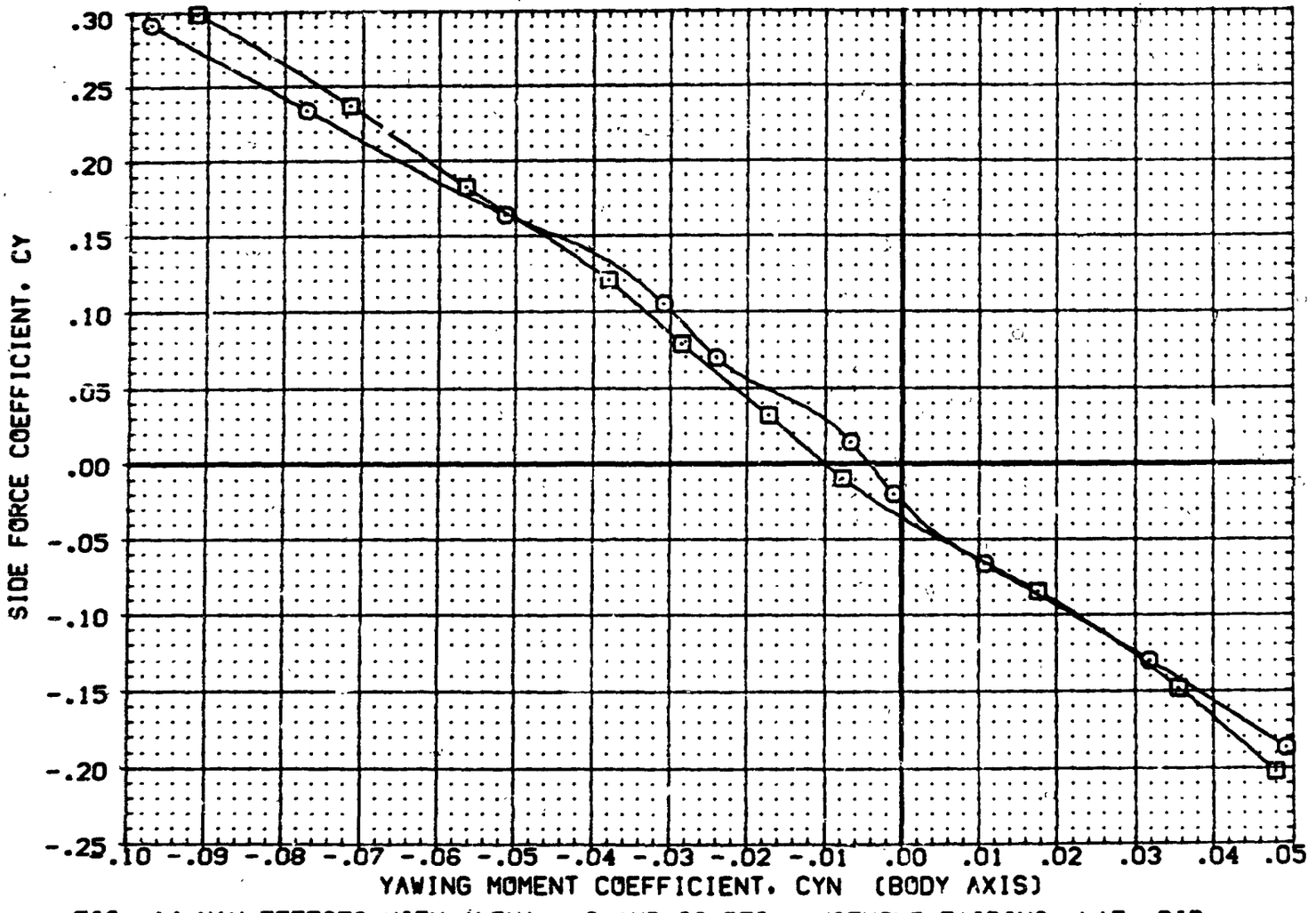


FIG. 14 YAW EFFECTS WITH ALPHA = 0 AND 30 DEG., WITHOUT FAIRING, LAT.-DIR.

(A)MACH = 7.32

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	RUDDER	AILRON	ELEVON	PLUMES
(KEG002)	AMES 3.5-175 IA15 OT+L+P1+A1+F	.000	.000	.000	.000
(KEG024)	AMES 3.5-175 IA15 OT+L+P1+A1+F PLUMES ON	.000	.000	.000	1.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

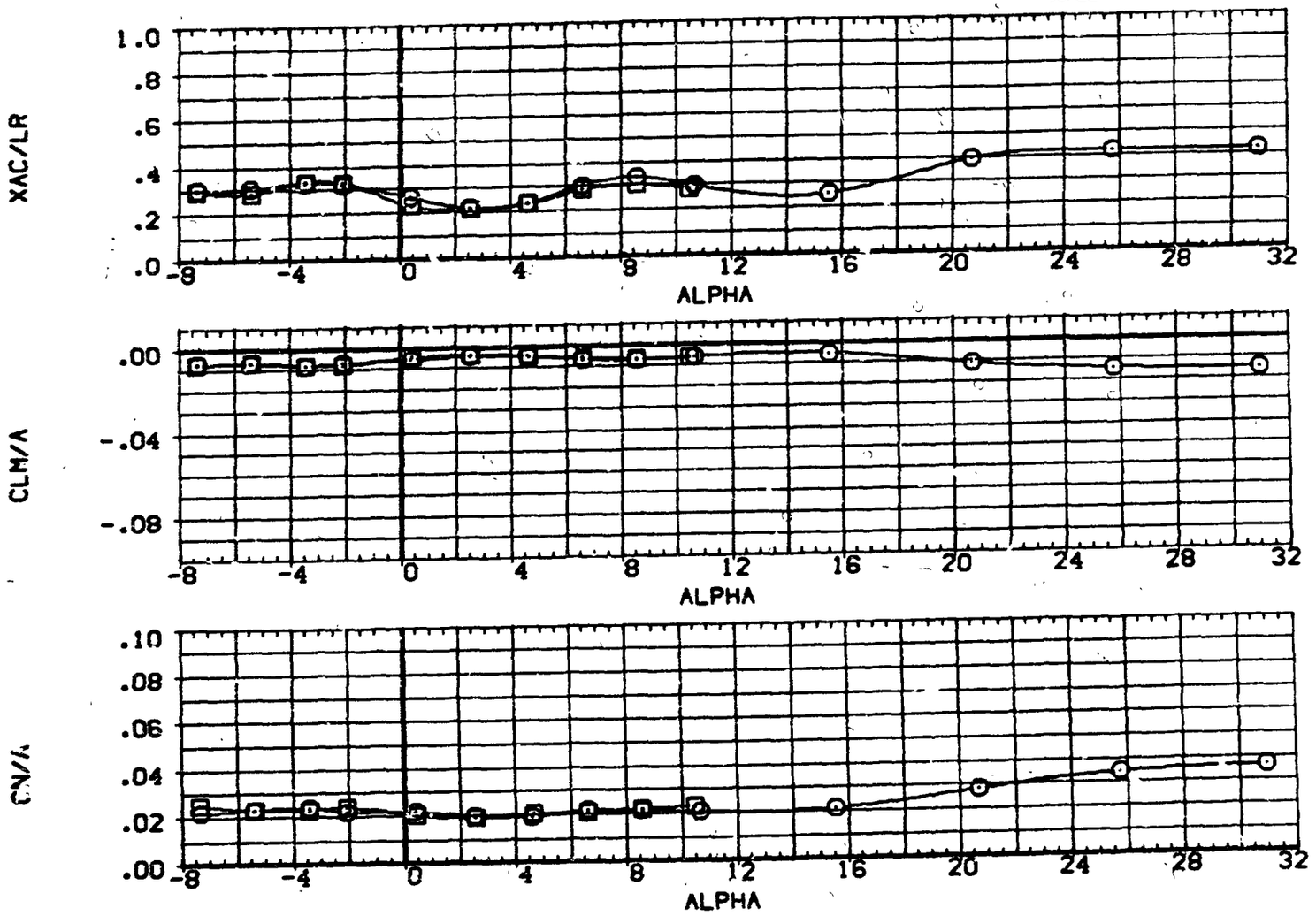


FIG. 15 SUMMARY OF SOLID PLUME PITCH EFFECTS.

(A)MACH = 7.32

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	RUDDER	AILRON	ELEVON	PLUMES
(<EGO14)	AMES 3.5-175 IA15 OT+L+P1+A1+F	.000	.000	.000	.000
(KEGO19)	AMES 3.5-175 IA15 OT+L+P1+A1+F PLUMES ON	.000	.000	.000	1.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

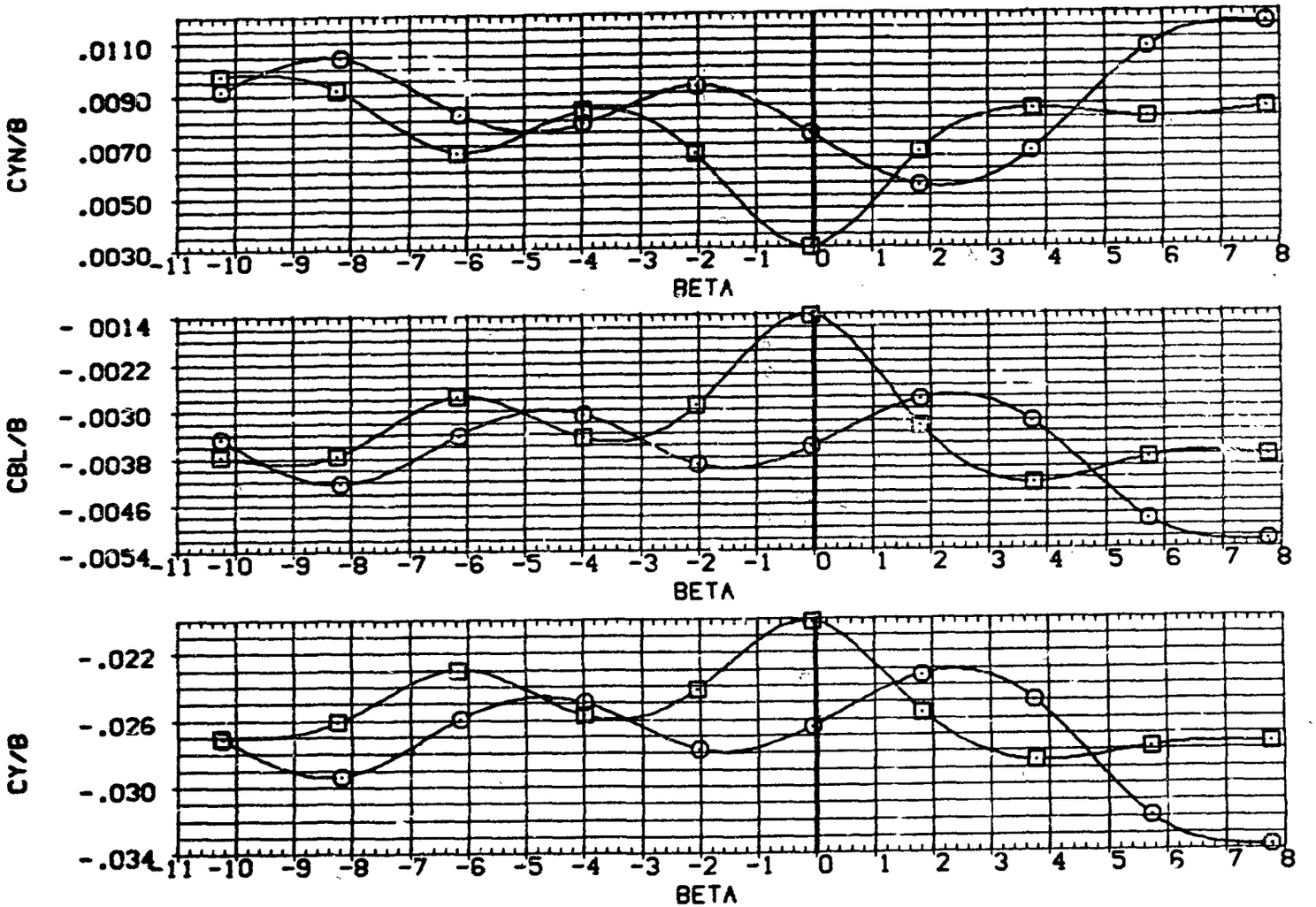


FIG. 16 SUMMARY OF SOLID PLUME YAW EFFECTS.

(A)MACH = 7.32

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	RUDDER	AILRON	ELEVON	PLUMES
(AEG014)	AMES 3.5-175 IAIS GT+L+P1+A1+F	.000	.000	.000	.000
(AE3019)	AMES 3.5-175 IAIS GT+L+P1+A1+F PLUMES ON	.000	.000	.000	1.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

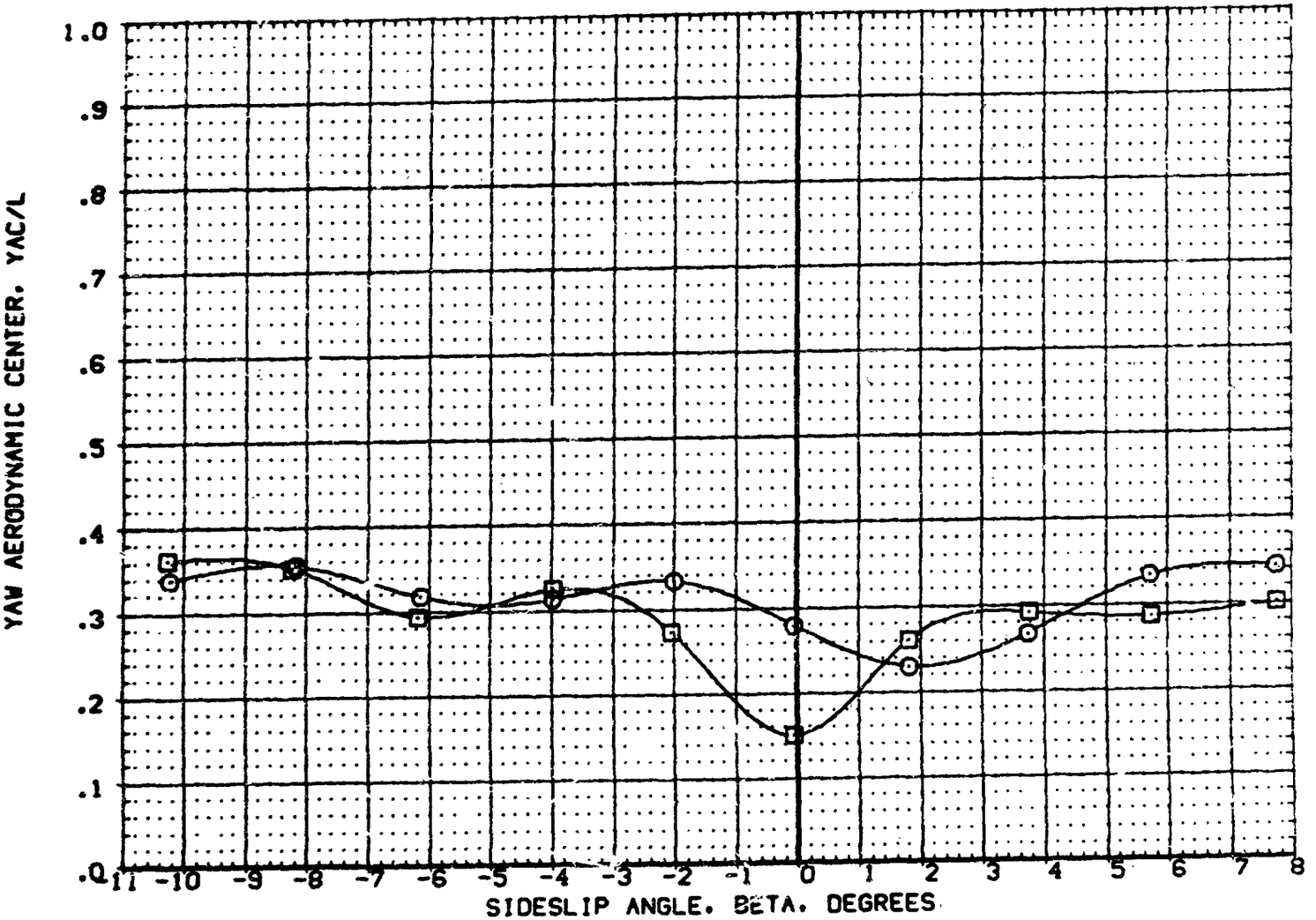


FIG. 16 SUMMARY OF SOLID PLUME YAW EFFECTS.

(A)MACH = 7.32

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	RUDDER	AILRON	ELEVON	PLUMES
(GEG006) ○	AMES 3.5-175 IA15 OT+L+PI+AI. DE = +15 TO 0	.000	.000		.000
(GEG008) □	AMES 3.5-175 IA15 OT+L+PI+AI. DE = 0 TO -20	.000	.000		.000
(GEG007) ◇	AMES 3.5-175 IA15 OT+L+PI+AI. DE = -20 TO -40	.000	.000		.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

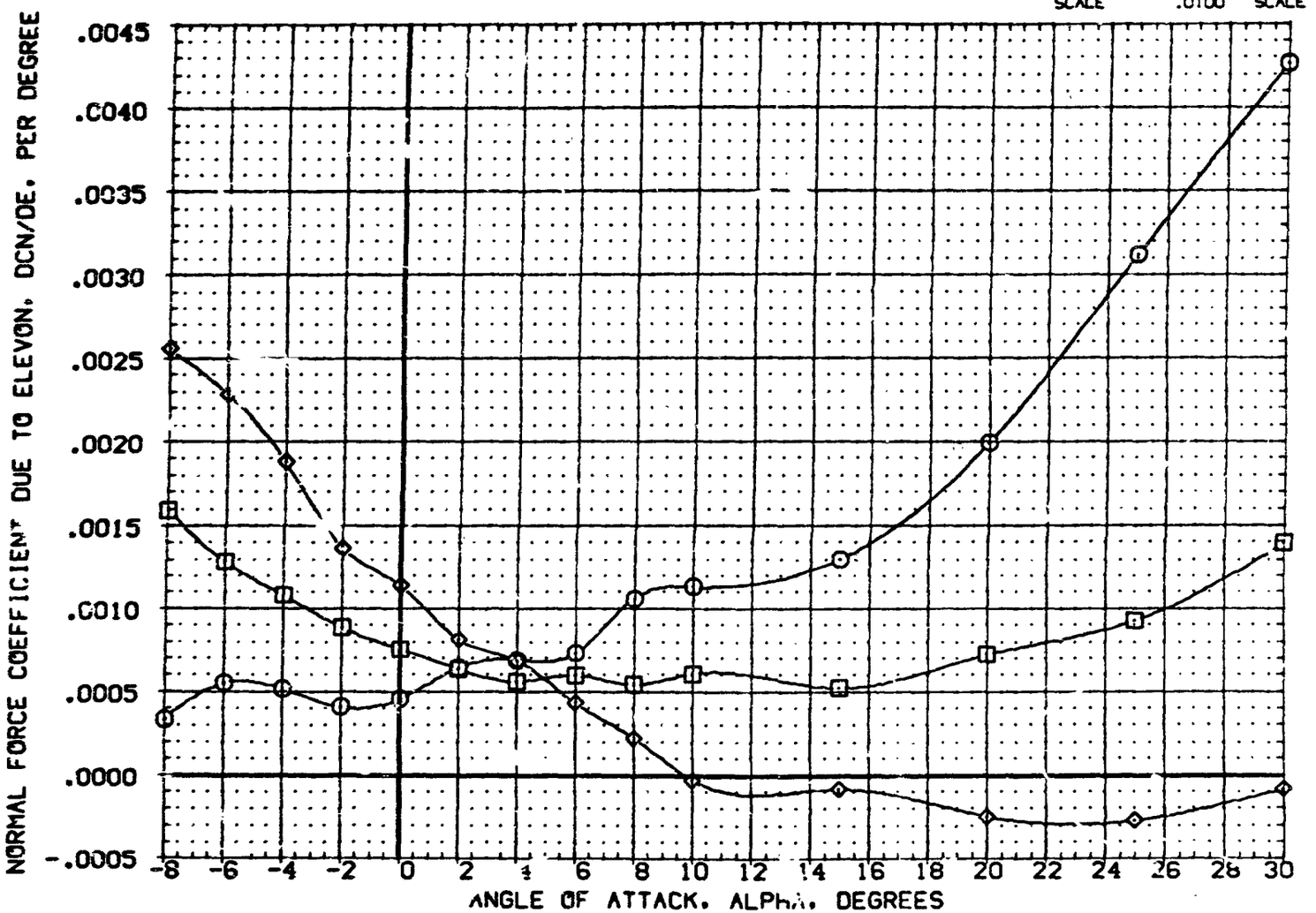


FIG. 17 SUMMARY OF ELEVON EFFECTIVENESS.

(A)MACH = 7.32

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	RUDDER	AILRON	ELEVON	PLUMES
(GEG006)	□	AMES 3.5-175 IA15 OT+L+P1+A1, DE = +15 TO 0	.000	.000		.000
(GEG008)	□	AMES 3.5-175 IA15 OT+L+P1+A1, DE = 0 TO -20	.000	.000		.000
(GEG007)	◇	AMES 3.5-175 IA15 OT+L+P1+A1, DE = -20 TO -40	.000	.000		.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

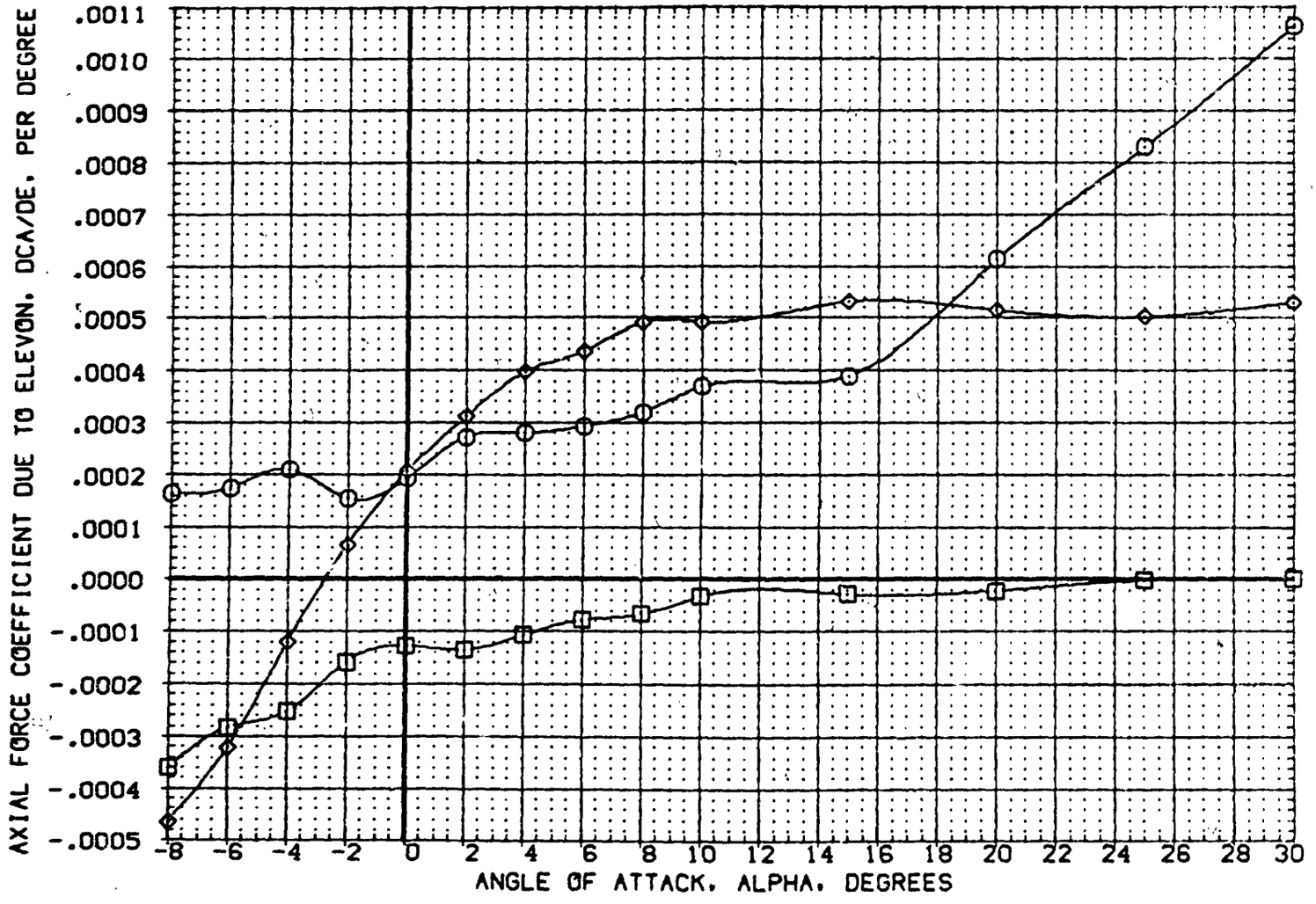


FIG. 17 SUMMARY OF ELEVON EFFECTIVENESS.

(A)MACH = 7.32

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	RUDDER	AILRON	ELEVON	PLUMES
(GEG006) ○	AMES 3.5-175 IA15 OT+L+PI+AI, DE = +15 TO 0	.000	.000		.000
(GEG008) □	AMES 3.5-175 IA15 OT+L+PI+AI, DE = 0 TO -20	.000	.000		.000
(GEG007) ◇	AMES 3.5-175 IA15 OT+L+PI+AI, DE = -20 TO -40	.000	.000		.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

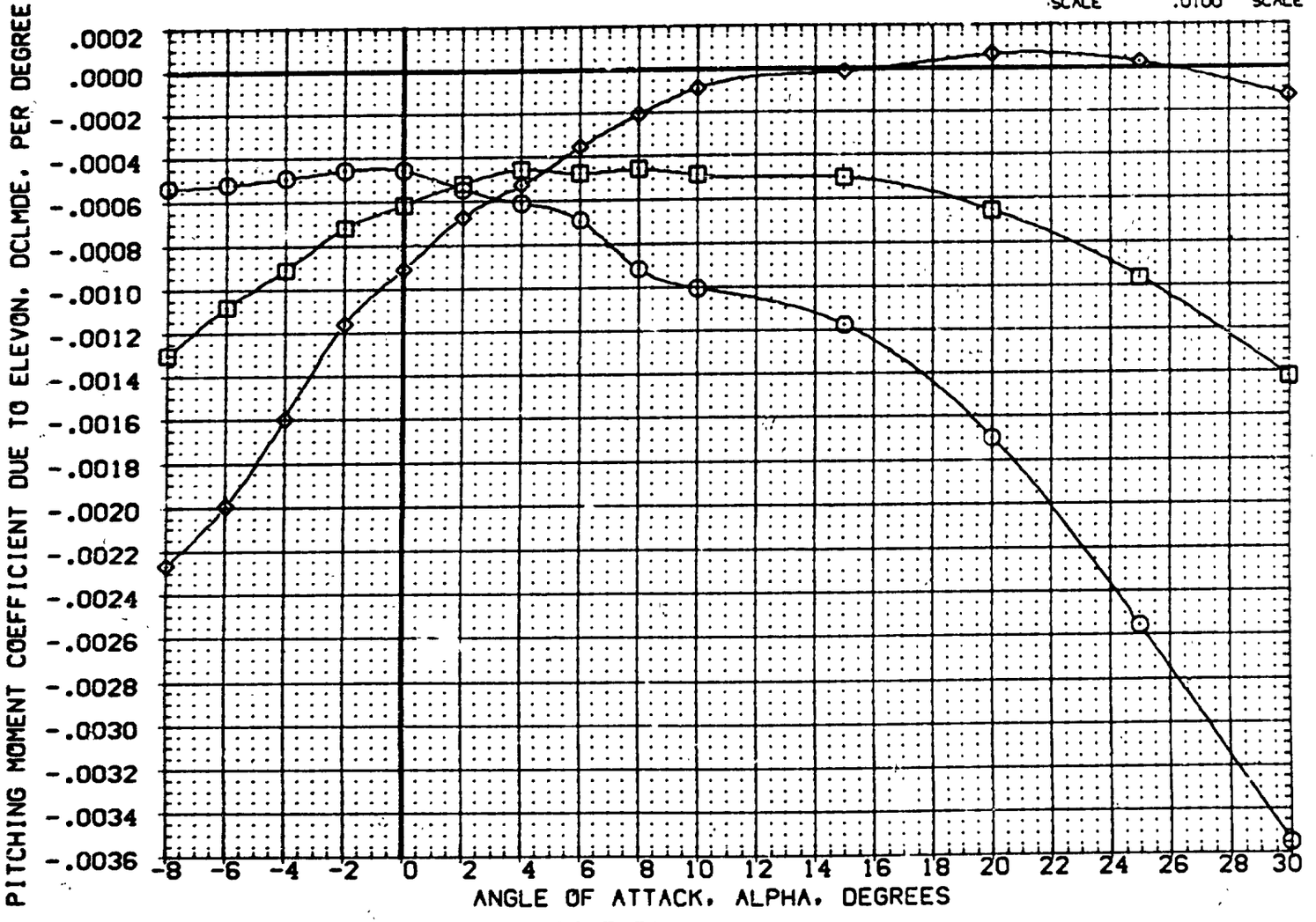


FIG. 17 SUMMARY OF ELEVON EFFECTIVENESS.

(A)MACH = 7.32

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(FEG009) ○	AMES 3.5-175 IAIS OT+L+P1+A1

RUDDER	AILRON	ELEVON	PLUMES
.000		.000	.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

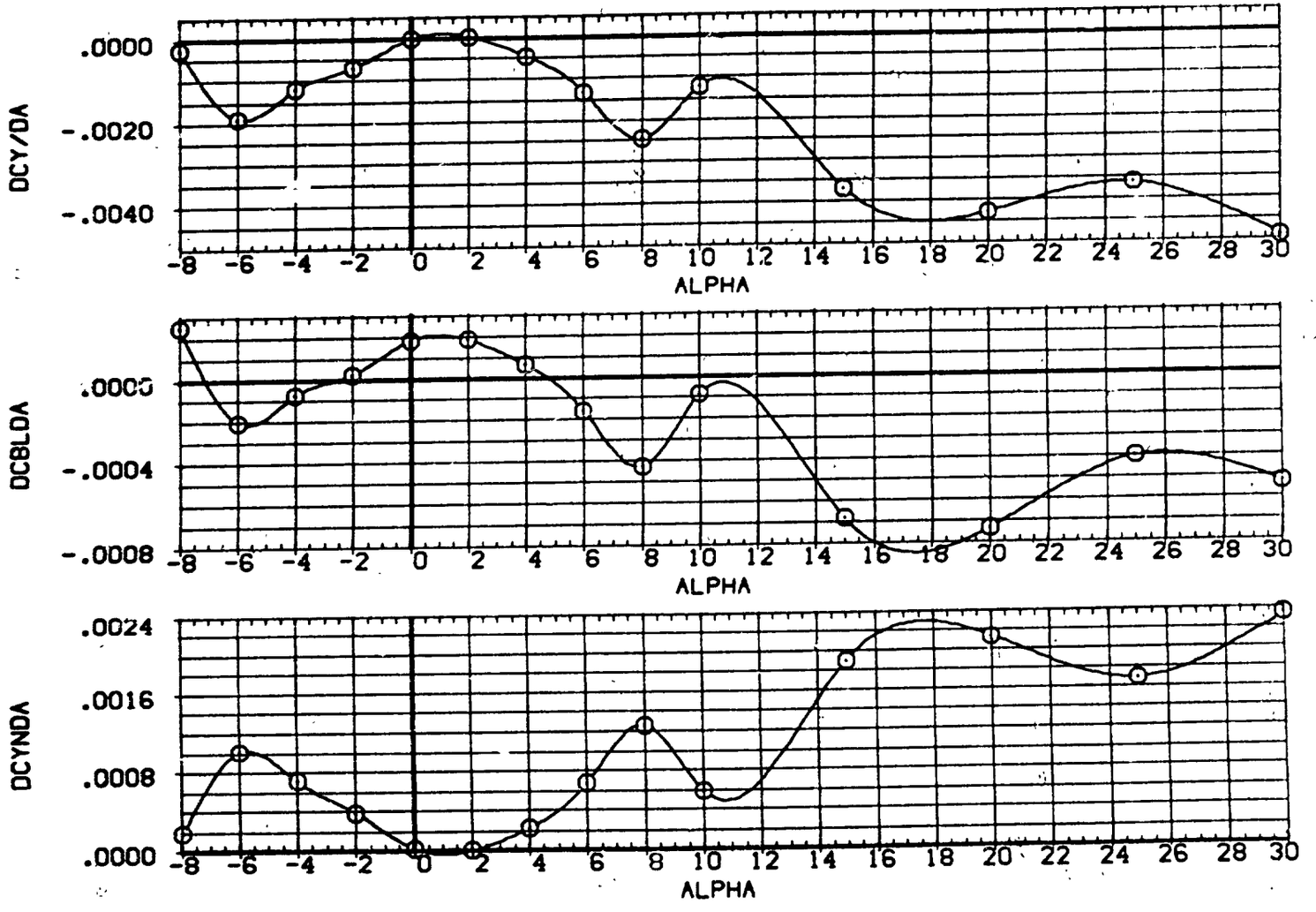


FIG. 18 SUMMARY OF AILERON EFFECTIVENESS.

(A)MACH = 7.32

DATA SET SYMBOL CONFIGURATION DESCRIPTION
(EEG015) ○ AMES 3.5-175 IA15 OT+L+P1+A1+F

RUDDER	AILRON	ELEVON	PLUMES
	.000	.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

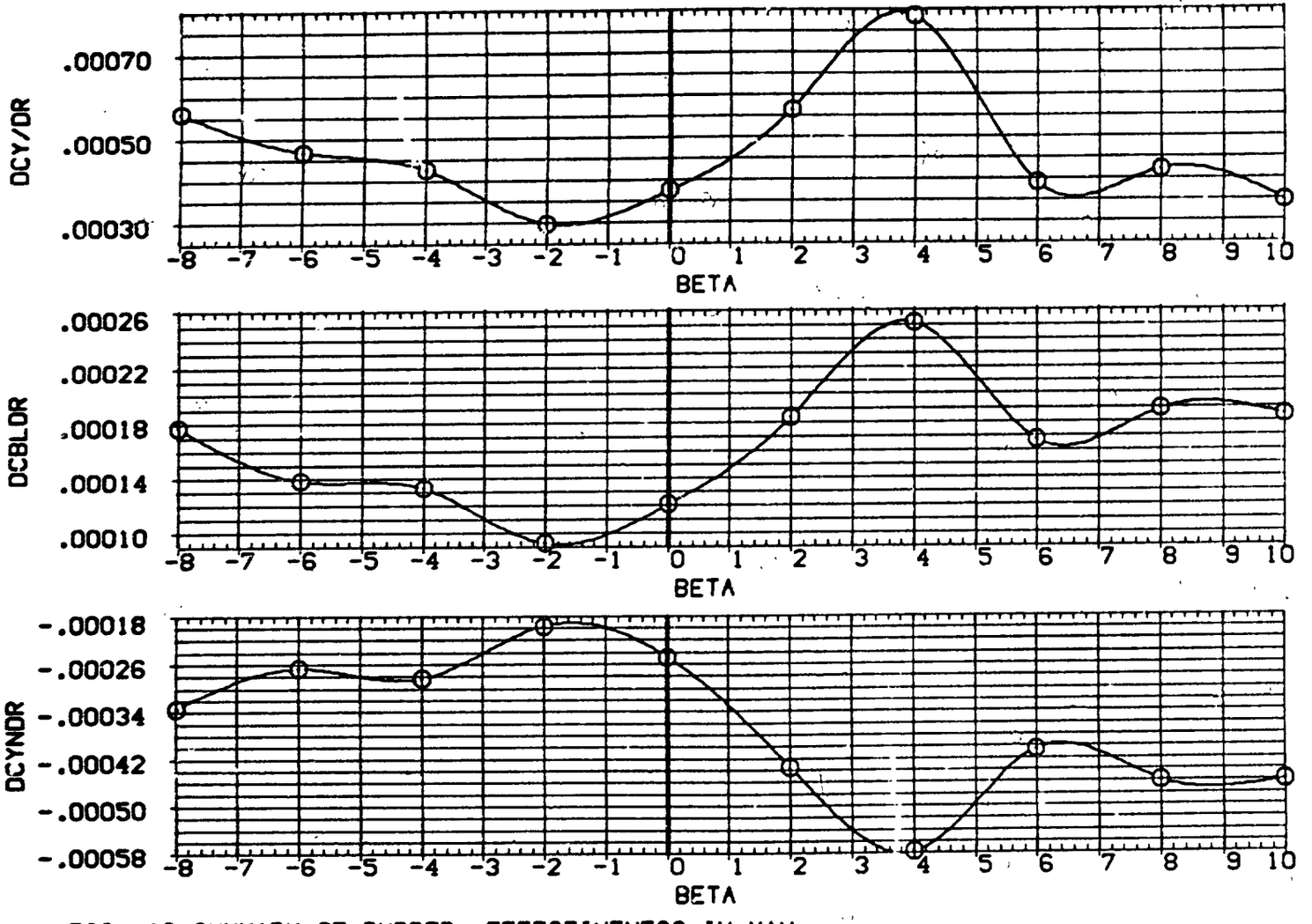


FIG. 19 SUMMARY OF RUDDER EFFECTIVENESS IN YAW.

(A)MACH = 7.32

DATA SET SYMBOL CONFIGURATION DESCRIPTION
(KEGO13) ○ AMES 3.5-175 IAIS OT+L+PI+AI+F

RUDDER	AILRON	ELEVON	PLUMES
.000	.000	.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

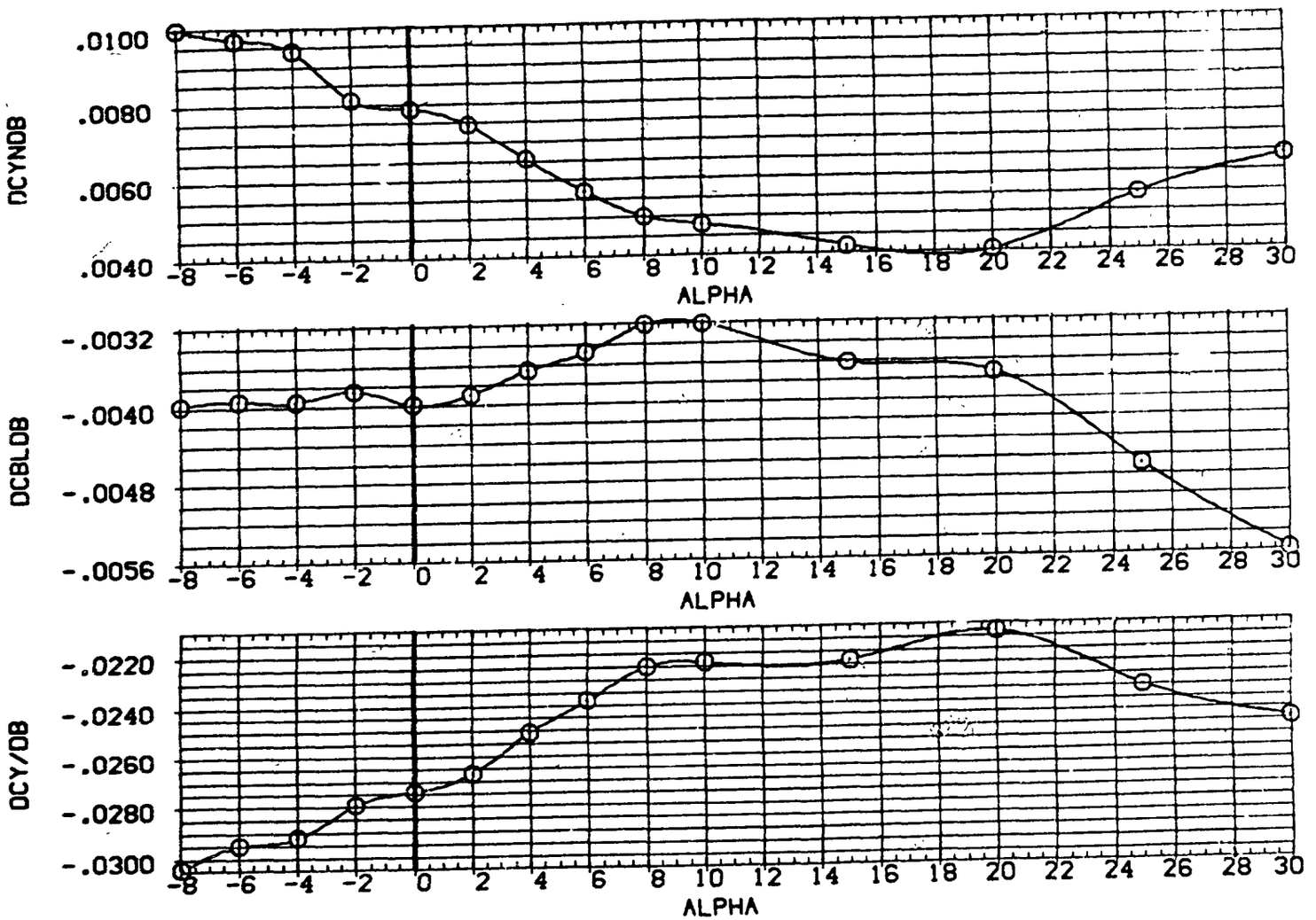


FIG. 20 SUMMARY OF BETA OFFSET EFFECTS IN PITCH, DBETA = 5 DEGS.

(A)MACH = 7.32

DATA SET SYMBOL CONFIGURATION DESCRIPTION
(XEGO13) ○ AMES 3.5-175 IA15 0T+L+P1+A1+F

RUDDER	AILRON	ELEVON	PLUMES
.000	.000	.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

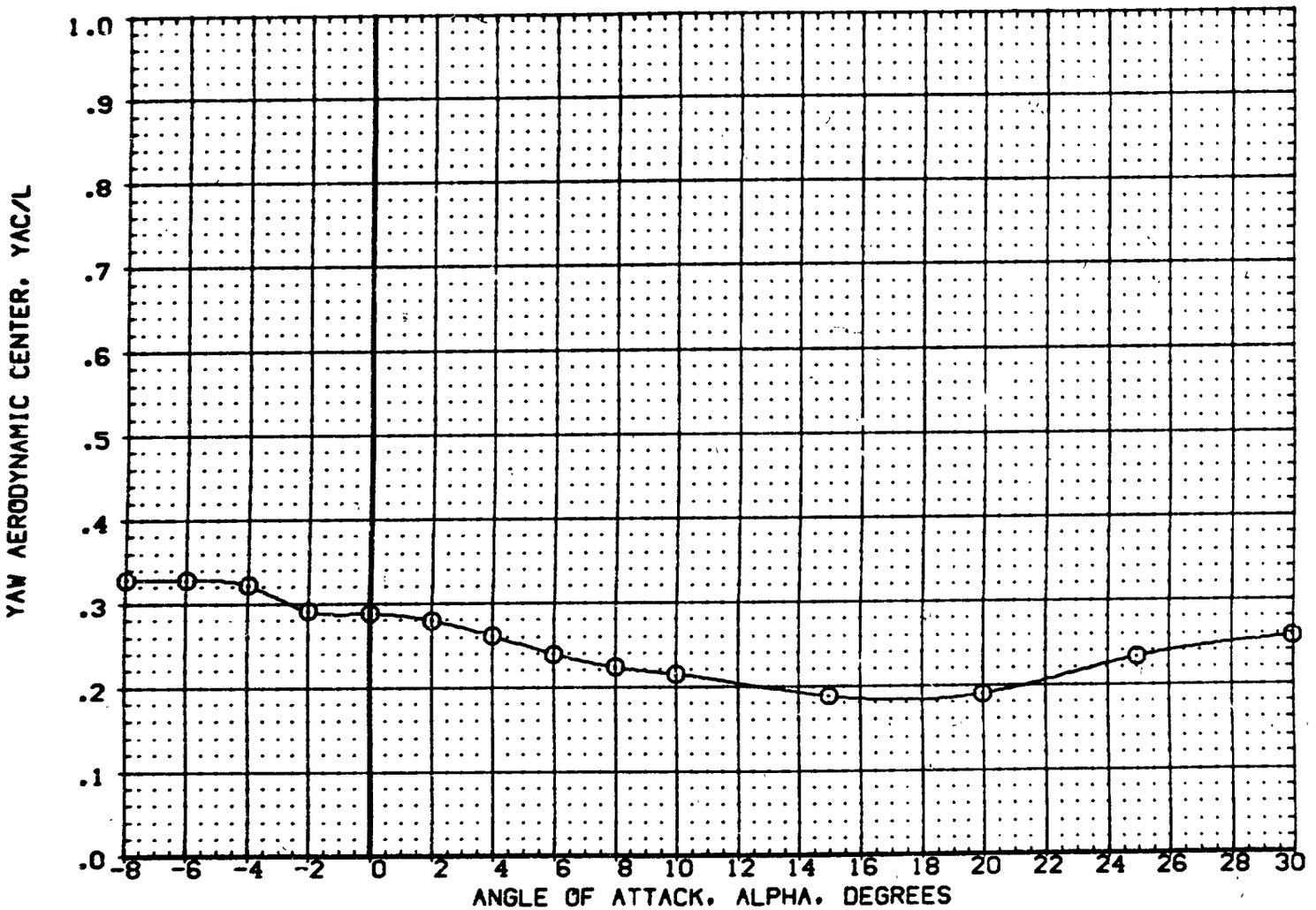


FIG. 20 SUMMARY OF BETA OFFSET EFFECTS IN PITCH, DBETA = 5 DEGS.

(A)MACH = 7.32

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ALPHA	AILRON	ELEVON	PLUMES
(KEGO16) ○	AMES 3.5-175 (AIS OT+L+P1+A1	.000	.000	.000	.000
(KEGO17) □	AMES 3.5-175 (AIS OT+L+P1+A1	30.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

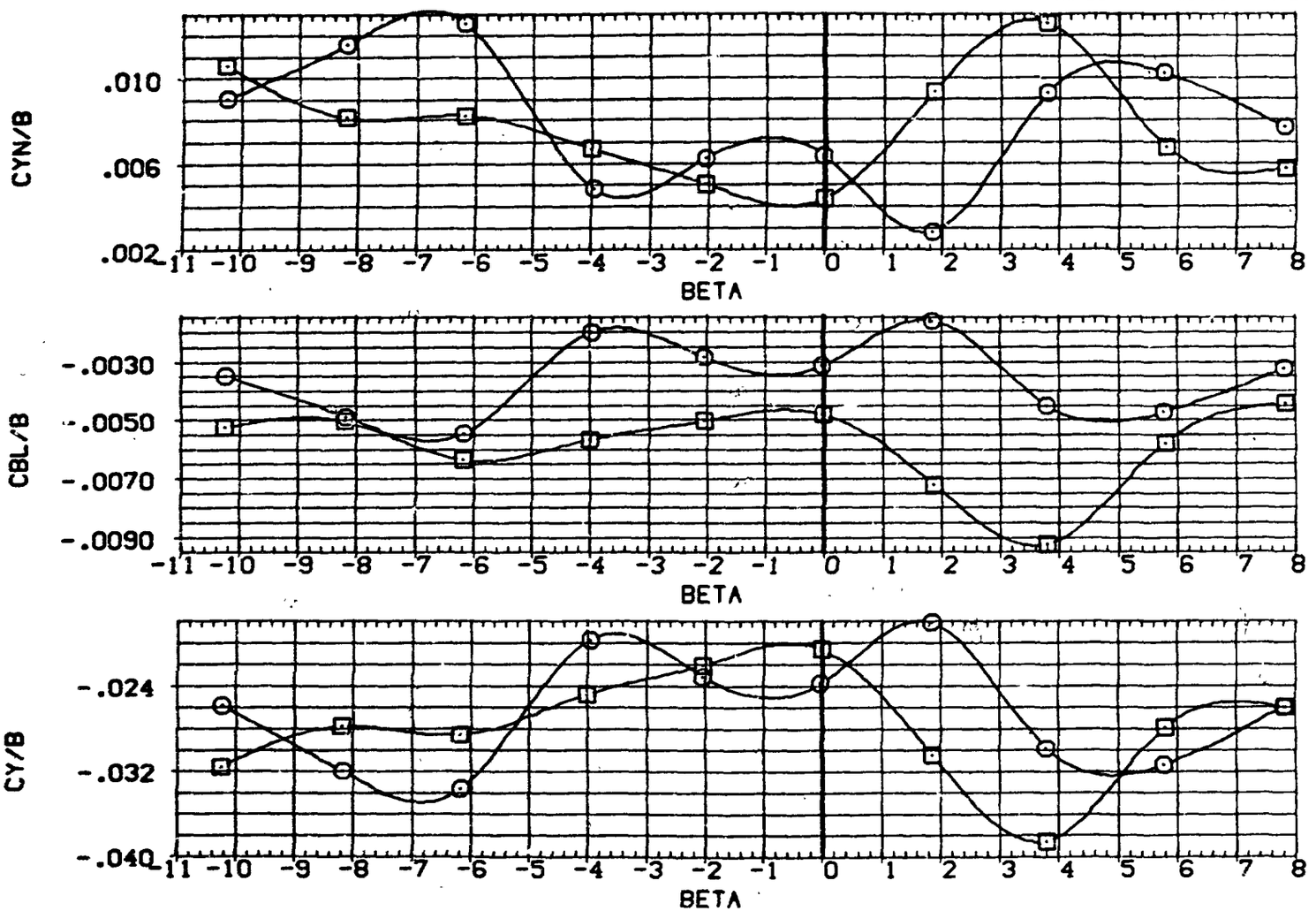


FIG. 21 SUMMARY OF ALPHA OFFSET EFFECTS IN YAW.

(A)MACH = 7.32

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ALPHA	AILRON	ELEVON	PLUMES
(KEG016)	AMES 3.5-175 (A15 OT+L+P1+A1	.000	.000	.000	.000
(KEG017)	AMES 3.5-175 (A15 OT+L+P1+A1	30.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

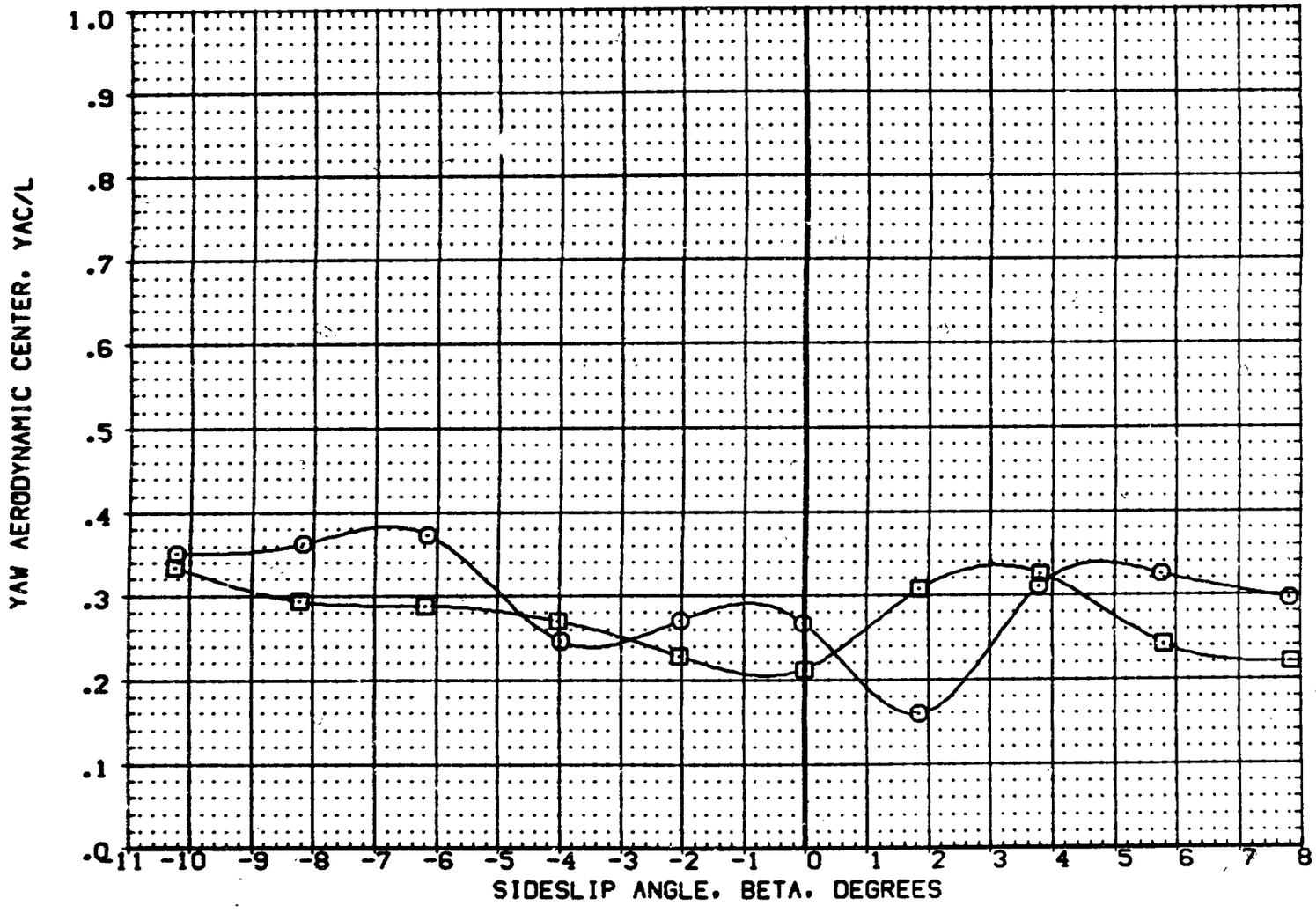


FIG. 21 SUMMARY OF ALPHA OFFSET EFFECTS IN YAW.

(A)MACH = 7.32

DATA SET SYMBOL (EEG003) ○ CONFIGURATION DESCRIPTION AMES 3.5-175 IA15 OT+L+P1+A1+F

RUDDER	AILRON	ELEVON	PLUMES
	.000	.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	IN.
BREF	936.6800	IN.
XMRP	989.0000	IN.
YMRP	.0000	IN.
ZMRP	67.0000	IN.
SCALE	.0100	SCALE

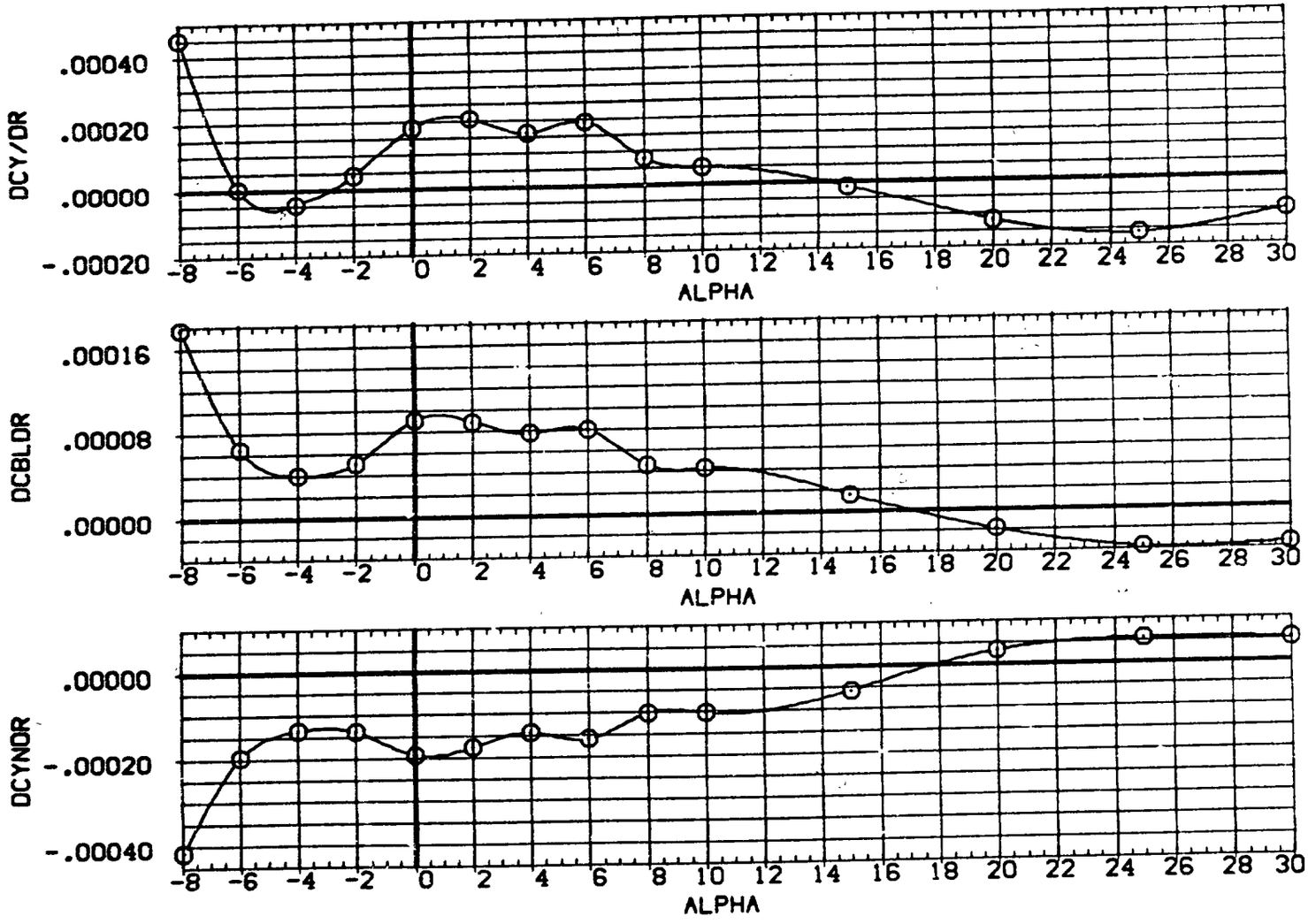


FIG. 22 SUMMARY OF RUDDER EFFECTIVENESS IN PITCH.

(A)MACH = 7.32

APPENDIX

TABULATED SOURCE DATA

Tabulations of plotted data are available on request from Data Management Services.

AMES 3.5-175 IA15 OT+L+P1+A1+F (REG002) (12 FEB 74)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 989.0000 IN.
LREF = 1290.3000 IN. YMRP = .0000 IN.
BREF = 936.8800 IN. ZMRP = 67.0000 IN.
SCALE = .0100 SCALE

PARAMETRIC DATA

BETA = .000 ELEVON = .000
AILRON = .000 RUDDER = .000
PLUMES = .000

RUN NO. 2/ 0 RN/L = 2.29 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CY	CA	CLM	CYN	CBL
7.320	-7.330	-.23776	-.01367	.20595	.09111	.00606	-.00295
7.320	-5.407	-.19556	-.01626	.19419	.07825	.00563	-.00304
7.320	-3.411	-.14817	-.01490	.18124	.06334	.00467	-.00259
7.320	-2.080	-.11777	-.01335	.17183	.05320	.00422	-.00235
7.320	.411	-.08523	-.00645	.16145	.03838	.00066	-.00072
7.320	2.527	-.02015	-.00542	.15135	.02710	.00036	-.00069
7.320	4.614	.01806	-.00528	.14329	.01939	.00027	-.00062
7.320	6.615	.05987	-.00331	.13505	.00779	-.00039	-.00013
7.320	8.563	.10119	-.00550	.12931	-.00533	.00004	-.00070
7.320	10.656	.14526	-.00005	.13041	-.01991	-.00236	.00065
7.320	15.575	.24384	-.00050	.11482	-.04249	-.00167	-.00018
7.320	20.726	.36872	-.00161	.10692	-.08497	-.00113	.00034
7.320	25.794	.52857	.00024	.10828	-.13084	-.00224	.00059
7.320	31.014	.71482	.00948	.11346	-.22696	-.00532	.00301
	GRADIENT	.02080	.00132	-.00464	-.00549	-.00062	.00027

AMES 3.5-175 IA15 OT+L+P1+A1+F (REC'D) (12 FEB 74)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 989.0000 IN.
LREF = 1290.3000 IN. YMRP = .0000 IN.
BREF = 936.6800 IN. ZMRP = 67.0000 IN.
SCALE = .0100 SCALE

PARAMETRIC DATA

BETA = .000 ELEVON = .000
AILRON = .000 RUDDER = -20.000
PLUMES = .000

RUN NO. 3/ 0 RN/L = 1.88 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CY	CA	CLM	CYN	CBL
7.320	-7.327	-.23824	-.02156	.21122	.09303	.01283	-.00570
7.320	-5.504	-.19556	-.01515	.19935	.07970	.00887	-.00399
7.320	-3.448	-.14942	-.01471	.18577	.06504	.00739	-.00346
7.320	-2.139	-.11900	-.01419	.17737	.05471	.00698	-.00336
7.320	.428	-.06462	-.01045	.16601	.03899	.00460	-.00262
7.320	2.521	-.02177	-.00930	.15656	.02858	.00359	-.00235
7.320	4.589	.01726	-.00851	.14833	.02054	.00317	-.00217
7.320	6.544	.05875	-.00700	.13990	.00881	.00269	-.00163
7.320	8.553	.10362	-.00635	.13381	-.00617	.00177	-.00143
7.320	10.514	.14030	-.00181	.13075	-.02150	.00011	-.00038
7.320	15.578	.24473	.00019	.11862	-.04304	-.00087	-.00032
7.320	20.717	.36710	.00091	.11058	-.08445	-.00185	.00076
7.320	25.782	.52797	.00345	.11189	-.15058	-.00333	.00137
7.320	31.013	.71498	.01092	.11629	-.23022	-.00632	.00364
	GRADIENT	.02074	.00084	-.00459	-.00553	-.00057	.00017

AMES 3.5-175 IA15 OT+L+F1+A1+F (REG004) (26 MAR 74)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 989.0000 IN.
LREF = 1290.3000 IN. YMRP = .0000 IN.
BREF = 936.6800 IN. ZMRP = 67.0000 IN.
SCALE = .0100 SCALE

PARAMETRIC DATA

BETA = .000 ELEVON = -40.000
AILRON = .000 RUDDER = .000
PLUMES = .000

RN/L = 2.02 GRADIENT INTERVAL = -5.00/ 5.00

MACH = 7.320

ALPHA	CN	CY	CA	CLM	CYN	CBL
-5.427	-.25360	-.01910	.22183	.13510	.00932	-.00240
-3.488	-.19948	-.01972	.21435	.11523	.00849	-.00247
-2.150	-.16124	-.01722	.20121	.09700	.00714	-.00231
.425	-.09713	-.01383	.18343	.07125	.00455	-.00215
2.526	-.04583	-.00888	.16973	.05340	.00201	-.00127
4.605	-.00404	-.00944	.15872	.04148	.00215	-.00150
6.596	.04146	-.00937	.14880	.(649	.00227	-.00168
8.553	.08673	-.00573	.14177	.01042	.00033	-.00064
10.495	.12635	-.00120	.13693	-.00440	-.00008	.00031
15.604	.23264	-.00039	.12383	-.02894	-.00166	-.00006
20.744	.35420	-.00115	.11653	-.06908	-.00130	.00069
25.832	.50932	.00260	.11811	-.12692	-.00317	.00135
31.016	.68682	.01134	.12364	-.19639	-.00594	.00373
GRADIENT	.02423	.00138	-.00681	-.00912	-.00085	.00014

AMES 3.8-175 1A13 OT+L+P1+A1+F (REG0005) (12 FEB 74)

REFERENCE DATA

SREF = 2890.0000 SQ.FT. XMRP = 989.0000 IN.
LREF = 1290.3000 IN. YMRP = .0000 IN.
BREF = 936.6800 IN. ZMRP = 67.0000 IN.
SCALE = .0100 SCALE

PARAMETRIC DATA

BETA = .000 ELEVON = 15.000
AILRON = .000 RUDDER = .000
PLUMES = .000

RUN NO. 5/ 0 RN/L = 2.00 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CY	CA	CLM	CYN	CBL
7.320	-7.392	-.22927	-.01693	.21408	.08222	.00831	-.00380
7.320	-5.327	-.18743	-.02014	.20228	.07014	.00695	-.00407
7.320	-3.314	-.14225	-.01712	.18954	.05715	.00537	-.00329
7.320	-2.171	-.11007	-.01425	.18100	.04630	.00398	-.00272
7.320	.367	-.05434	-.00904	.16973	.02975	.00091	-.00159
7.320	2.503	-.01033	-.00201	.16097	.01843	-.00237	.00011
7.320	4.529	.02969	-.00546	.15316	.00931	-.00126	-.00067
7.320	6.547	.07457	-.00185	.14562	-.00431	-.00252	.00009
7.320	8.522	.12036	-.00120	.14072	-.01059	-.00286	.00051
7.320	10.474	.16109	.00310	.14044	-.03363	-.00468	.00155
7.320	15.579	.26641	.00304	.12798	-.06121	-.00384	.00074
7.320	20.715	.40108	.00653	.12389	-.11236	-.00554	.00247
7.320	25.764	.58248	.00991	.12937	-.19419	-.00722	.00329
7.320	30.999	.79727	.00995	.14077	-.29333	-.00657	.00342
	GRADIENT	.02134	.00172	-.00445	-.00593	-.00085	.00037

AMES 3.5-175 IA15 OT+L+P1+A1 (REG006) (12 FEB 74)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 989.0000 IN.
CF = 1290.3000 IN. YMRP = .0000 IN.
BREF = 936.6800 IN. ZMRP = 87.0000 IN.
SCALE = .0100 SCALE

PARAMETRIC DATA

BETA = .000 ELEVON = 15.000
AILRON = .000 RUDDER = .000
FLAPS = .000

RUN NO. 6/ 0 RN/L = 1.95 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CY	CA	CLM	CYN	CBL
7.320	-7.450	-.23273	-.01651	.21090	.08394	.00577	-.00316
7.320	-5.520	-.18746	-.00844	.20031	.07134	.00149	-.00110
7.320	-3.571	-.14521	-.00551	.18864	.05889	-.00051	-.00009
7.320	-2.231	-.11513	-.00344	.17974	.04867	.00124	-.00111
7.320	.340	-.05789	-.00845	.16866	.03185	.00047	-.00148
7.320	2.427	-.01383	.00008	.15998	.02041	-.00332	.00061
7.320	4.478	.02700	-.00452	.15254	.01099	-.00093	-.00066
7.320	6.509	.07095	-.00560	.14559	-.00241	-.00073	-.00093
7.320	8.474	.11613	-.00162	.14062	-.01815	-.00284	.00023
7.320	10.413	.15852	.00771	.14113	-.03254	-.00714	.00273
7.320	15.564	.26829	-.00028	.12879	-.06205	-.00234	-.00020
7.320	20.736	.40582	.00374	.12508	-.11408	-.00451	.00166
7.320	25.766	.58511	.00631	.12941	-.19437	-.00604	.00255
7.320	31.078	.80618	.01457	.14040	-.29724	-.00889	.00459
	GRADIENT	.02147	.00054	-.00441	-.00596	-.00026	.00004

AMES 3.5-175 IA15 OT+L+P1+A1 (REG007) (12 FEB 74)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 989.0000 IN.
LREF = 1290.3000 IN. YMRP = .0000 IN.
BREF = 936.6800 IN. ZMRP = 67.0000 IN.
SCALE = .0100 SCALE

PARAMETRIC DATA

BETA = .000 ELEVON = -40.000
AILRON = .000 RUDDER = .000
PLUMES = .000

RUN NO. 7/ 0 RN/L = 1.98 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CY	CA	CLM	CYN	CBL
7.320	-7.408	-.31728	.00279	.22340	.16021	-.00321	.00283
7.320	-5.514	-.26430	.00170	.20881	.13805	-.00271	.00304
7.320	-3.527	-.20724	-.00392	.19150	.11280	.00029	.00157
7.320	-2.187	-.16637	-.01187	.17944	.09381	.00406	-.00086
7.320	.385	-.10052	-.00609	.16339	.06787	.00034	-.00021
7.320	2.451	-.05[illegible]2	.00364	.15166	.05126	-.00514	.00215
7.320	4.532	-.00628	-.00610	.14168	.03698	-.00018	-.00072
7.320	6.557	.04132	.00436	.13343	.02393	-.00565	.00191
7.320	8.497	.08549	.00676	.12685	.00680	-.00715	.00263
7.320	10.486	.13268	.00135	.12622	-.00670	- 00407	.00123
7.320	15.607	.24014	.00255	.11254	-.03367	-.00428	.00075
7.320	20.831	.36680	.00984	.10546	-.07555	-.00782	.00362
7.320	25.834	.52354	.00971	.10642	-.13422	-.00711	.00339
7.320	31.197	.71319	.02179	.11305	-.20822	-.01257	.00670
	GRADIENT	.02489	.00162	-.00609	-.00911	-.00053	-.00005

AMES 3.5-175 IA15 OT+L+P1+A1 (REG008) (12 FEB 74)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 989.0000 IN.
LREF = 1290.3000 IN. YMRP = .0000 IN.
BREF = 936.6000 IN. ZMRP = 67.0000 IN.
SCALE = .0100 SCALE

PARAMETRIC DATA

BETA = .000 ELEVON = -20.000
AILRON = .000 RUDDER = .000
PLANES = .000

RUN NO. 8/ 0 RN/L = 1.95 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CY	CA	CLN	CYN	CBL
7.320	-7.402	-.26760	-.00499	.21488	.11636	-.00015	-.00014
7.320	-5.507	-.22006	.00482	.20295	.09986	-.00573	.00271
7.320	-3.508	-.17186	.01130	.18992	.08293	-.00956	.00483
7.320	-2.181	-.13616	.00282	.18042	.06990	-.00497	.00207
7.320	.378	-.07687	.00022	.16799	.05055	-.00398	.00093
7.320	2.520	-.03410	.01086	.15802	.03840	-.00982	.00364
7.320	4.541	.00883	-.00357	.15009	.02911	-.00163	-.00022
7.320	6.548	.04808	.00174	.14243	.01790	-.00493	.00111
7.320	8.556	.09028	.01327	.13618	.00485	-.00992	.00404
7.320	10.494	.13103	.01280	.13596	-.00804	-.01023	.00419
7.320	15.651	.23954	.00967	.12315	-.03416	-.00765	.00252
7.320	20.800	.36025	.00729	.11564	-.07378	-.00678	.00271
7.320	25.836	.51863	.02251	.11654	-.13419	-.01426	.00665
7.320	31.177	.71172	.01510	.12379	-.21146	-.00812	.00481
	GRADIENT	.02214	-.00097	-.00488	-.00666	.00049	-.00037

AMES 3.5-175 IA15 OT+L+P1+A1 (REG008) (12 FEB 74)

REFERENCE DATA

SREF =	2890.0000 SQ.FT.	XMRP =	989.0000 IN.
LREF =	1290.3000 IN.	YMRP =	.0000 IN.
BREF =	936.6800 IN.	ZMRP =	67.0000 IN.
SCALE =	.0100 SCALE		

PARAMETRIC DATA

BETA =	.000	ELEVON =	.000
AILRON =	10.000	RUDDER =	.000
PLUMES =	.000		

RUN NO. 9/ 0 RN/L = 2.03 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CY	CA	CLM	CYN	CBL
7.320	-7.430	-.24654	.01081	.21213	.09818	-.00815	.00701
7.320	-5.519	-.20362	.00239	.20063	.08510	-.00390	.00484
7.320	-3.539	-.15480	.00255	.18863	.08929	-.00425	.00439
7.320	-2.195	-.12347	.01038	.17967	.05620	-.00850	.00593
7.320	.371	-.08623	.01748	.16797	.04032	-.01291	.00717
7.320	2.465	-.02237	.01872	.15867	.02696	-.01392	.00741
7.320	4.538	.01774	.00906	.15075	.02044	-.00886	.00487
7.320	6.545	.06039	.01157	.14367	.00861	-.01016	.00555
7.320	8.515	.10043	.00857	.13611	-.00444	-.00863	.00509
7.320	10.483	.14780	.01068	.13796	-.01987	-.00988	.00602
7.320	15.595	.25322	.01062	.12468	-.04660	-.00935	.00559
7.320	20.812	.36314	.00932	.11628	-.09149	-.00913	.00727
7.320	25.826	.54990	.00466	.11983	-.16098	-.00750	.00781
7.320	31.163	.75426	.01677	.12774	-.24692	-.01276	.01332
	GRADIENT	.02142	.00098	-.00463	-.00606	-.00068	.00011

AMES 3.5-17S IA1S OT+L+P1+A1 (RE6010) (12 FEB 74)

REFERENCE DATA

SREF = 2890.0000 SQ.FT. XMRP = 989.0000 IN.
LREF = 1290.3000 IN. YMRP = .0000 IN.
BREF = 936.6800 IN. ZMRP = 67.0000 IN.
SCALE = .0100 SCALE

PARAMETRIC DATA

BETA = .000 ELEVON = .000
AILRON = .000 RUDDER = .000
PLUMES = .000

RUN NO. 10/ 0 RN/L = 2.09 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CY	CA	CLM	CYN	CBL
7.320	-7.490	-.23878	.01834	.20843	.08195	-.01257	.00593
7.320	-5.537	-.19834	.02218	.19768	.07917	-.01449	.00899
7.320	-3.510	-.15103	.01203	.18517	.06566	-.01006	.00460
7.320	-2.196	-.12090	.01786	.17717	.05531	-.01259	.00578
7.320	.374	-.08434	.01675	.16542	.03864	-.01270	.00516
7.320	2.454	-.02334	.01935	.15565	.02676	-.01435	.00561
7.320	4.507	.01734	.01532	.14826	.02015	-.01200	.00471
7.320	6.524	.05946	.02615	.14102	.00652	-.01655	.00793
7.320	8.507	.09993	.03283	.13563	-.00395	-.02101	.00924
7.320	10.443	.14251	.01954	.13548	-.01766	-.01392	.00598
7.320	15.390	.24846	.05210	.12272	-.04391	-.03076	.01354
7.320	20.812	.37591	.04974	.11528	-.08782	-.02900	.01375
7.320	25.678	.53954	.04179	.11659	-.15546	-.02484	.01174
7.320	31.164	.74208	.07011	.12375	-.24215	-.03854	.01925
	GRADIENT	.02096	.00036	-.00459	-.00566	-.00025	.00000

AMES 3.5-175 IA15 OT+L+P1+A1+F (RE6012) (12 FEB 74)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 989.0000 IN.
LREF = 1290.3000 IN. YMRP = .0000 IN.
BREF = 936.6800 IN. ZMRP = 87.0000 IN.
SCALE = .0100 SCALE

PARAMETRIC DATA

BETA = 5.000 ELEVON = .000
AILRON = .000 RUDDER = -20.000
PLUMES = .000

RUN NO. 12/ 0 RN/L = 2.08 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CY	CA	CLM	CYN	CBL
7.320	-8.273	-.25436	-.17528	.23421	.10013	.06640	-.02678
7.320	-6.362	-.20806	-.18999	.22272	.08362	.06290	-.02598
7.320	-4.344	-.16054	-.16359	.21180	.06999	.05730	-.02455
7.320	-3.018	-.13197	-.15409	.20347	.06193	.05073	-.02235
7.320	-.463	-.07282	-.14766	.18707	.04143	.04596	-.02264
7.320	1.666	-.02757	-.14145	.17587	.02809	.04247	-.02191
7.320	3.720	.01392	-.13499	.16674	.01766	.03833	-.02107
7.320	5.726	.05510	-.12581	.15852	.00680	.03302	-.01939
7.320	7.668	.09613	-.12026	.15058	-.00537	.02932	-.01820
7.320	9.704	.14193	-.11644	.14255	-.02069	.02556	-.01709
7.320	14.773	.24464	-.10748	.13394	-.04815	.01910	-.01740
7.320	19.981	.36335	-.10733	.12782	-.09918	.01924	-.01832
7.320	25.097	.54871	-.11379	.12916	-.16614	.02430	-.02217
7.320	30.325	.74045	-.11778	.13130	-.24663	.02782	-.02603
	GRADIENT	.02179	.00331	-.00565	-.00667	-.00219	.00034

AMES 3.5-175 IA15 OT+L+P1+A1+F (REG013) (12 FEB 74)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 989.0000 IN.
LREF = 1290.3000 IN. YMRP = .0000 IN.
BREF = 936.6800 IN. ZMRP = 67.0000 IN.
SCALE = .0100 SCALE

PARAMETRIC DATA

BETA = 5.000 ELEVON = .000
AILRON = .000 RUDDER = .000
PLUMES = .000

RUN NO. 13/ 0 RN/L = 2.08 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CY	CA	CLM	CYN	CBL
7.320	-8.245	-.25107	-.16803	.23119	.09664	.05639	-.02275
7.320	-6.289	-.20257	-.16413	.21971	.08053	.05442	-.02273
7.320	-4.366	-.15765	-.16246	.21006	.06745	.05294	-.02261
7.320	-3.019	-.13055	-.15781	.20144	.06010	.04817	-.02198
7.320	-.467	-.07238	-.14605	.18550	.04025	.04132	-.02106
7.320	1.690	-.02636	-.13977	.17452	.02650	.03799	-.02023
7.320	3.703	.01486	-.13243	.16493	.01586	.03391	-.01924
7.320	5.732	.05478	-.12353	.15728	.00593	.02868	-.01771
7.320	7.704	.09881	-.11844	.14902	-.00764	.02559	-.01685
7.320	9.670	.14405	-.11435	.14140	-.02252	.02287	-.01588
7.320	14.811	.24698	-.11177	.13328	-.04918	.01905	-.01806
7.320	19.981	.38693	-.10817	.12756	-.10114	.01914	-.01842
7.320	25.006	.54706	-.11797	.12689	-.16533	.02537	-.02299
7.320	30.281	.74094	-.11692	.13076	-.24711	.02732	-.02560
	GRADIENT	.02157	.00375	-.00561	-.00658	-.00230	.00041

AMES 3.5-175 IA15 OT+L+P1+A1+F (REG014) (12 FEB 74)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 989.0000 IN.
LREF = 1290.3000 IN. YMRP = .0000 IN.
BREF = 936.6800 IN. ZMRP = 67.0000 IN.
SCALE = .0100 SCALE

PARAMETRIC DATA

ALPHA = .000 ELEVON = .000
AILRON = .000 RUDDER = .000
PLUMES = .000

RUN NO. 14/ 0 RN/L = 1.98 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	CN	CY	CA	CLM	CYN	CBL
7.320	-10.243	-.07851	.29158	.20511	.03676	-.09737	.04008
7.320	-8.183	-.07844	.23415	.19654	.03788	-.07762	.03240
7.320	-6.130	-.07892	.17468	.19030	.03970	-.05689	.02373
7.320	-3.985	-.08083	.12395	.18375	.04142	-.04210	.01764
7.320	-2.013	-.08082	.06982	.17973	.04184	-.02382	.01042
7.320	-.048	-.07453	.01723	.17600	.03987	-.00783	.00311
7.320	1.828	-.07634	-.03070	.17885	.04157	.00453	-.00324
7.320	3.757	-.07801	-.07457	.18212	.04320	.01466	-.00842
7.320	5.729	-.07446	-.13187	.18620	.04246	.03246	-.01674
7.320	7.759	-.07293	-.19916	.19306	.04114	.05537	-.02718
	GRADIENT	.00053	-.02575	-.00022	.00017	.00735	-.00343

AMES 3.5-175 IA15 OT+L+P1+A1+F (REG015) (12 FEB 74)

REFERENCE DATA

SREF = 2890.0000 SQ.FT. XMRP = 989.0000 IN.
LREF = 1290.3000 IN. YMRP = .0000 IN.
BREF = 936.6800 IN. ZMRP = 67.0000 IN.
SCALE = .0100 SCALE

PARAMETRIC DATA

ALPHA = .000 ELEVON = .000
AILRON = .000 RUDDER = -20.000
PLUMES = .000

RUN NO. 15/ 0 RN/L = 2.07 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	CN	CY	CA	CLM	CYN	CBL
7.320	-10.256	-.07551	.27561	.19992	.03555	-.08830	.03551
7.320	-8.188	-.07501	.22270	.19240	.03660	-.07078	.02878
7.320	-6.141	-.07366	.16552	.18570	.03772	-.05163	.02097
7.320	-4.013	-.07408	.11610	.17944	.03880	-.03665	.01527
7.320	-2.017	-.07473	.06395	.17561	.03910	-.01990	.00858
7.320	-.085	-.07133	.01076	.17255	.03801	-.00323	.00086
7.320	1.846	-.07487	-.04193	.17607	.04183	.01295	-.00680
7.320	3.794	-.07021	-.09155	.17874	.04059	.02658	-.01362
7.320	5.783	-.06837	-.14198	.18380	.04087	.04135	-.02145
7.320	7.765	-.06592	-.20751	.19016	.03952	.06437	-.03087
	GRADIENT	.00039	-.02676	-.00005	.00032	.00818	-.00376

AMES 3.5-175 IA15 OT+L+P1+A1 (REG015) (12 FEB 74)

REFERENCE DATA

SREF = 2890.0000 SQ.FT. XMRP = 989.0000 IN.
LREF = 1290.3000 IN. YMRP = .0000 IN.
BREF = 936.6800 IN. ZMRP = 67.0000 IN.
SCALE = .0100 SCALE

PARAMETRIC DATA

ALPHA = .000 ELEVON = .000
AILRON = .000 RUDDER = .000
PLUMES = .000

RUN NO. 16/ 0 RN/L = 2.08 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	CN	CY	CA	CLM	CYN	CBL
7.320	-10.230	-.07961	.29111	.19289	.03751	-.09737	.04171
7.320	-8.185	-.07923	.23412	.18664	.03814	-.07715	.03360
7.320	-6.163	-.07948	.16427	.18036	.04020	-.05139	.02242
7.320	-3.972	-.07778	.10442	.17550	.04047	-.03078	.01364
7.320	-2.030	-.08000	.06921	.17203	.04174	-.02392	.01070
7.320	-.021	-.07485	.01453	.17056	.04047	-.00668	.00255
7.320	1.854	-.07606	-.01990	.17207	.04208	-.00099	-.00065
7.320	3.800	-.07500	-.06597	.17405	.04196	.01073	-.00649
7.320	5.771	-.07161	-.13021	.17811	.04149	.03180	-.01663
7.320	7.621	-.07022	-.18706	.18369	.04019	.04923	-.02431
	GRADIENT	.00049	-.02214	-.00015	.00017	.00546	-.00266

AMES 3.5-175 IA15 OT+L+P1+A1 (REG017) (12 FEB 74)

REFERENCE DATA

SREF = 2890.0000 SQ.FT. XMRP = 989.0000 IN.
LREF = 1290.3000 IN. YMRP = .0000 IN.
BREF = 936.6800 IN. ZMRP = 67.0000 IN.
SCALE = .0100 SCALE

PARAMETRIC DATA

ALPHA = 30.000 ELEVON = .000
AILRON = .000 RUDDER = .000
PLUMES = .000

RUN NO. 17/ 0 RN/L = 2.02 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	CN	CY	CA	CLM	CYN	CBL
7.320	-10.254	.85562	.29891	.13349	-.30828	-.09146	.06546
7.320	-8.210	.84410	.23704	.12942	-.30020	-.07154	.05487
7.320	-6.174	.82436	.18259	.12515	-.28605	-.05657	.04384
7.320	-4.009	.80648	.12004	.12093	-.27504	-.03796	.02938
7.320	-2.039	.79785	.07834	.11854	-.26947	-.02845	.02001
7.320	-.019	.78948	.03124	.11698	-.26535	-.01721	.00896
7.320	1.865	.79372	-.00970	.11727	-.26772	-.01759	-.00060
7.320	3.802	.81201	-.08455	.12089	-.27789	.01766	-.01852
7.320	5.796	.83298	-.14840	.12497	-.29094	.03560	-.03321
7.320	7.834	.85690	-.20263	.12897	-.30596	.04797	-.04317
	GRADIENT	.00033	-.02545	-.00007	-.00019	.00676	-.00596

AMES 3.5-175 IA15 OT+L+P1+A1 (REG018) (12 FEB 74)

REFERENCE DATA

SREF = 2890.0000 SQ.FT. XMRP = 989.0000 IN.
LREF = 1290.3000 IN. YMRP = .0000 IN.
BREF = 936.6800 IN. ZMRP = 67.0000 IN.
SCALE = .0100 SCALE

PARAMETRIC DATA

ALPHA = -10.000 ELEVON = .000
AILRON = .000 RUDDER = .000
PLUMES = .000

RUN NO. 18/ 0 RN/L = 2.49 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	CN	CY	CA	CLM	CYN	CBL
7.320	-10.256	-.25649	-.87778	.23884	.10043	.27187	-.18587
7.320	-8.267	-.27738	4.09108	.25027	.11175	-1.14400	1.08805
7.320	-6.185	-.27513	3.87041	.24632	.10925	-1.08523	1.02357
7.320	-4.022	-.27290	3.45612	.24128	.10628	-.97124	.90877
7.320	-2.070	-.27219	1.46150	.22965	.10281	-.40869	.38667
7.320	-.081	-.25916	-.79176	.22012	.09674	.22843	-.20355
7.320	1.810	-.29327	5.11885	.24288	.11378	-1.45254	1.31408
7.320	3.716	-.28247	-.03473	.22618	.10425	.00508	-.02382
7.320	5.668	-.31287	4.74227	.24782	.12246	-1.35402	1.20084
7.320	7.755	-.31725	3.36493	.24905	.12308	-.96888	.83671
	GRADIENT	-.00206	-.17435	-.00089	.00035	.04769	-.04912

AMES 3.5-175 IA15 OT+L+P1+A1+F PLUMES ON (REG019) (12 FEB 74)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 989.0000 IN.
LREF = 1290.3000 IN. YMRP = .0000 IN.
BREF = 936.6800 IN. ZMRP = 67.0000 IN.
SCALE = .0100 SCALE

PARAMETRIC DATA

ALPHA = .000 ELEVON = .000
AILRON = .000 RUDDER = .000
PLUMES = 1.000

RUN NO. 19/ 0 RN/L = 2.01 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	CN	CY	CA	CLM	CYN	CBL
7.320	-10.265	-.07448	.25838	.16852	.03064	-.07904	.03207
7.320	-8.245	-.07755	.20235	.16336	.03308	-.05966	.02447
7.320	-6.183	-.07858	.15125	.15940	.03492	-.04277	.01741
7.320	-3.978	-.07775	.10028	.15534	.03637	-.02817	.01157
7.320	-2.041	-.07754	.04851	.15246	.0352[illegible]	-.01108	.00420
7.320	-.058	-.06333	.00721	.14421	.03179	-.00366	.00078
7.320	1.826	-.07414	-.03567	.15267	.03526	.00520	-.00339
7.320	3.764	-.07749	-.08935	.15713	.03830	.02074	-.01131
7.320	5.744	-.07440	-.14505	.15990	.03724	.03654	-.01922
7.320	7.766	-.07411	-.20105	.16533	.03628	.05313	-.02697
	GRADIENT	.00022	-.02394	.00018	.00020	.00590	-.00276

AMES 3.5-175 IA15 OT+L+P1+A1+F PLUMES ON (REG020) (12 FEB 74)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 989.0000 IN.
LREF = 1290.3000 IN. YMRP = .0000 IN.
BREF = 936.6800 IN. ZMRP = 67.0000 IN.
SCALE = .0100 SCALE

PARAMETRIC DATA

ALPHA = .000 ELEVON = .000
AILRON = .000 RUDDER = -20.000
PLUMES = 1.000

RUN NO. 20/ 0 RN/L = 1.83 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	CN	CY	CA	CLM	CYN	CBL
7.320	-10.283	-.07414	.25952	.18050	.03298	-.07935	.03216
7.320	-8.254	-.07614	.20736	.17441	.03479	-.06132	.02527
7.320	-6.174	-.07825	.15316	.17010	.03711	-.04347	.01769
7.320	-3.974	-.08108	.10116	.16578	.03970	-.02763	.01125
7.320	-2.052	-.07834	.05253	.16229	.03766	-.01425	.00578
7.320	-.062	-.06610	.01127	.15557	.03471	-.00749	.00268
7.320	1.852	-.07865	-.03887	.16260	.03987	.00600	-.00405
7.320	3.774	-.07783	-.09115	.16722	.04109	.02230	-.01199
7.320	5.719	-.07915	-.15271	.17224	.04354	.04387	-.02200
7.320	7.773	-.07554	-.21445	.17689	.04014	.06271	-.03112
	GRADIENT	.00032	-.02453	.00016	.00026	.00619	-.00290

AMES 3.5-175 IA15 OT+L+P1+A1 PLUMES ON (REG021) (12 FEB 74)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 989.0000 IN.
LREF = 1290.3000 IN. YMRP = .0000 IN.
BREF = 936.6800 IN. ZMRP = 67.0000 IN.
SCALE = .0100 SCALE

PARAMETRIC DATA

ALPHA = .000 E VON = .000
AILRON = .000 RUDDER = .000
PLUMES = 1.000

RUN NO. 21/ 0 RN/L = 2.03 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	CN	CY	CA	CLM	CYN	CBL
7.320	-10.239	-.08019	.25901	.17541	.03532	-.07683	.03241
7.320	-8.185	-.08043	.20657	.17162	.03648	-.05901	.02527
7.320	-6.176	-.08346	.15559	.16751	.03985	-.04273	.01863
7.320	-3.985	-.08430	.10115	.16382	.04142	-.02749	.01168
7.320	-1.997	-.08243	.05012	.16140	.04025	-.01141	.00463
7.320	-.084	-.06918	.00700	.15421	.03499	-.00252	.00072
7.320	1.832	-.08298	-.03879	.16082	.04242	.00550	-.00404
7.320	3.821	-.07819	-.09037	.16466	.04165	.01984	-.01114
7.320	5.724	-.07660	-.14812	.16787	.04228	.03752	-.01971
7.320	7.756	-.07349	-.21016	.17173	.03911	.05654	-.02861
	GRADIENT	.00060	-.02428	.00006	.00013	.00574	-.00280

AMES 3.5-175 IA15 OT+L+P1+A1 PLUMES ON (REG022) (12 FEB 74)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 989.0000 IN.
LREF = 1290.3000 IN. YMRP = .0000 IN.
BREF = 936.6800 IN. ZMRP = 67.0000 IN.
SCALE = .0100 SCALE

PARAMETRIC DATA

BETA = .000 ELEVON = .000
AILRON = .000 RUDDER = .000
PLUMES = 1.000

RUN NO. 22/ 0 RN/L = 2.29 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CY	CA	CLM	CYN	CBL
7.320	-7.340	-.23926	-.02153	.19917	.08773	.00636	-.00354
7.320	-5.380	-.19140	-.02173	.18900	.07356	.00564	-.00324
7.320	-3.410	-.14826	-.01883	.17818	.06043	.00633	-.00321
7.320	-2.051	-.11569	-.01812	.17044	.04993	.00455	-.00272
7.320	.458	-.06165	-.01789	.15859	.03466	.00391	-.00313
7.320	2.584	-.01987	-.01850	.15151	.02600	.00442	-.00358
7.320	4.646	.02068	-.01353	.14469	.01740	.00336	-.00251
7.320	6.630	.05927	-.01378	.13784	.00777	.00293	-.00269
7.320	8.561	.10063	-.01335	.13306	-.00472	.00362	-.00268
7.320	10.464	.14062	-.01190	.12879	-.01620	.00280	-.00214
	GRADIENT	.02087	.00049	-.00412	-.00528	-.00028	.00002

AMES 3.5-175 IA15 OT+L+P1+A1+F PLUMES ON (REG023) (12 FEB 74)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 989.0000 IN.
LREF = 1290.3000 IN. YMRP = .0000 IN.
BREF = 936.6800 IN. ZMRP = 67.0000 IN.
SCALE = .0100 SCALE

PARAMETRIC DATA

BETA = .000 ELEVON = .000
AILRON = .000 RUDDER = -20.000
PLUMES = 1.000

RUN NO. 23/ 0 RN/L = 2.20 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CY	CA	CLM	CYN	CBL
7.320	-7.352	-.23476	-.00347	.20125	.08467	-.00527	.00277
7.320	-5.394	-.19122	-.00336	.19054	.07193	-.00535	.00243
7.320	-3.373	-.14298	-.00420	.17966	.05757	-.00371	.00199
7.320	-2.087	-.11291	-.00397	.17207	.04758	-.00259	.00139
7.320	.466	-.06022	-.00141	.16101	.03349	-.00452	.00189
7.320	2.580	-.01642	-.00257	.15250	.02342	-.00327	.00112
7.320	4.626	.02265	-.00319	.14573	.01525	-.00214	.00066
7.320	6.634	.06559	-.00164	.13818	.00373	-.00242	.00086
7.320	8.514	.10359	-.00340	.13320	-.00734	-.00039	.00013
7.320	10.702	.15160	-.00111	.12657	-.02041	-.00113	.00057
	GRADIENT	.02067	.00017	-.00421	-.00524	.00011	-.00014

AMES 3.5-175 IA15 OT+L+P1+A1+F PLUMES ON (REG024) (12 FEB 74)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 989.0000 IN.
LREF = 1290.3000 IN. YMRP = .0000 IN.
BREF = 936.6800 IN. ZMRP = 67.0000 IN.
SCALE = .0100 SCALE

PARAMETRIC DATA

BETA = .000 ELEVON = .000
AILRON = .000 RUDDER = .000
PLUMES = 1.000

RUN NO. 24/ 0 RN/L = 2.17 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CY	CA	CLM	CYN	CBL
7.320	-7.350	-.23749	-.01218	.20077	.08629	.00297	-.00115
7.320	-5.372	-.18940	-.00820	.19006	.07214	-.00032	.00041
7.320	-3.431	-.14645	-.01480	.17914	.05930	.00478	-.00204
7.320	-2.077	-.11433	-.01097	.17134	.04824	.00212	-.00099
7.320	.452	-.05883	-.00549	.15993	.03322	-.00194	.00012
7.320	2.582	-.01615	-.00773	.15159	.02453	.00074	-.00086
7.320	4.657	.02512	-.00947	.14484	.01535	.00193	-.00135
7.320	6.624	.06362	-.00828	.13764	.00512	.00211	-.00118
7.320	8.556	.10409	-.00471	.13263	-.00723	.00067	-.00039
7.320	10.487	.14737	-.00217	.12895	-.01972	-.00109	.00044
	GRADIENT	.02086	.00065	-.00422	-.00533	-.00032	.00007

AMES 3.5-175 IA15 OT+L+P1+A1 PLUMES ON (REG025) (12 FEB 74)

REFERENCE DATA

SREF	=	2690.0000 SQ.FT.	XMRP	=	989.0000 IN.
LREF	=	1290.3000 IN.	YMRP	=	.0000 IN.
BREF	=	93 .6800 IN.	ZMRP	=	67.0000 IN.
SCALE		.0100 SCALE			

PARAMETRIC DATA

BETA =	.000	ELEVON =	15.000
AILRON =	.000	RUDDER =	.000
PLUMES =	1.000		

RUN NO. 25/ 0 RN/L = 1.89 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CY	CA	CLM	CYN	CBL
7.320	-7.404	-.23100	-.01112	.20010	.07907	.00128	-.00055
7.320	-5.522	-.18626	-.01333	.19050	.06662	.00149	-.00100
7.320	-3.515	-.14242	-.00882	.17920	.05376	.00126	-.00061
7.320	-2.171	-.11103	-.00730	.17182	.04333	-.00015	-.00032
7.320	.380	-.05535	-.00476	.16058	.02781	-.00158	-.00003
7.320	2.496	-.01200	-.00432	.15328	.01779	-.00145	-.00011
7.320	4.549	.02805	-.00724	.14740	.00861	.00004	-.00098
7.320	6.540	.07355	-.00793	.14133	-.00464	.00110	-.00134
7.320	8.501	.11453	-.00200	.13728	-.01847	-.00087	.00011
7.320	10.467	.15620	.00157	.13334	-.03179	-.00339	.00125
7.320	15.533	.26529	-.00199	.12605	-.05959	-.00[illegible]	-.00052
7.320	20.722	.40013	.00584	.12034	-.10974	-.00418	.00242
7.320	25.796	.58405	.00610	.12460	-.19313	-.00424	.00240
7.320	31.062	.80570	.00808	.13315	-.29550	-.00458	.00293
	GRADIENT	.02114	.00029	-.00393	-.00555	-.00017	-.00003